ETIOLOGY AND OUTCOME OF NON TRAUMATIC COMA IN CHILDREN

Dissertation submitted for

M.D. DEGREE EXAMINATION
BRANCH VII- PAEDIATRIC MEDICINE

THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY
CHENNAI

APRIL 2013

INSTITUTE OF CHILD HEALTH AND
HOSPITAL FOR CHILDREN
MADRAS MEDICAL COLLEGE
CHENNAI

CERTIFICATE

This is to certify that the dissertation titled **"ETIOLOGY AND OUTCOME OF NON TRAUMATIC COMA IN CHILDREN"** submitted by **Dr. KANNAN. D.,** to the Faculty of Paediatrics, The Tamil Nadu Dr. M.G.R. Medical University, Chennai in partial fulfillment of the requirement for the award of M.D. Degree (Pediatrics) is a bonafide research work carried out by him under our direct supervision and guidance.

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Dr. KANNAN. D.

Place : Chennai

Date :

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ETIOLOGY AND OUTCOME OF NON TRAUMATIC COMA IN CHILDREN Dissertation submitted for M.D. DEGREE EXAMINATION BRANCH VII- PAEDIATRIC MEDICINE THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY CHENNAI APRIL 2013 INSTITUTE OF CHILD HEALTH AND HOSPITAL FOR CHILDREN MADRAS MEDICAL COLLEGE CHENNAI CERTIFICATE This is to certify that the dissertation titled “ETIOLOGY AND OUTCOME OF NON TRAUMATIC COMA IN CHILDREN” submitted by Dr. KANNAN. D., to the Faculty of Paediatrics, The Tamil Nadu Dr. M.G.R. Medical University, Chennai in partial fulfillment of the requirement for the award of M.D. Degree (Pediatrics) is a bonafide research work carried out by him under our direct supervision and guidance....

CONTENTS

INTRODUCTION

INTRODUCTION

"THOSE WHO HAVE LIKENED OUR LIFE TO A DREAM WERE MORE RIGHT, BY CHANCE THAN THEY RELIALISED.WE ARE AWAKE WHILE SLEEPING, AND WAKING SLEEP."

- MONTAIGNE

KOMA in GREEK means DEEP SLEEP.

Coma is a real medical emergency and constitute a diagnostic and therapeutic challenge for the pediatricians and intensivists.

Coma is a state, in which a child could not be aroused by any sort of stimuli (verbal, physical, sensory, etc.) and no attempt is to avoid painful stimuli. It is the disorder of arousability. The degree of response to an environmental stimulus is reduced which is in contrast to that degree found in sleep[1].

The aim of management should be to prevent secondary injury to the brain[1].

.

Normal consciousness is maintained by integrity of certain areas in the cerebral cortex, thalamus and part of reticular formation located in the upper pons and midbrain. Lesion affecting the brainstem or diffuse lesions in the cerebral cortex or both may lead to disturbances of consciousness[1].

Coma can be of traumatic and non traumatic etiology. Coma due to head trauma is usually due to intracerebral haemorrage, concussion or diffuse axonal injury which needs neurosurgical intervention.

The causes for non-traumatic coma in children includes central nervous system (CNS) infections – meningitis, enchepalitis, hypoxic ischemic encephalopathy, metabolic conditions, vascular lesions like infarction & haemorrage, space occupying lesions, toxins & poisons and post ictal states.

Even with great improvements in medical care, non-traumatic coma is likely to acquire a greater importance as a neurological handicap in children. So, every pediatrician should develop a diagnostic and therapeutic routine on a patient with coma in order to provide better outcome to the family as well as the country.

Non-traumatic coma has the numerical significance of about 10-12% of the intensive care unit admissions and is associated with great number of mortality and morbidity.

The principle pathophysiology of the etiology, severity at the time of presentation, nature of risk factors are determinant factors of the outcome.

Impairment of the conscious level is objectively graded according to Glasgow coma scale (GCS) and is used to monitor the progress on treatment. Although it has some limitations in young children and infants, a Modified form of the GCS (MGCS) has been used in them to assess the severity. A careful neurological examination is very important in an unconscious children. Posture, pupil size and reactivity, spontaneous eye ball movements and the reflex eye movements helps to determine the level of structural damage and depth of coma.

ANATOMICAL BASIS:

Consciousness mainly depends on connection between the cortical and sub cortical structures particularly reticular activating system. The Ascending reticular activating system (ARAS) lies in the paramedian tegmental portion of the posterior part of the Pons and the Midbrain. Abducent and the Oculomotor nuclei are connected by median longitudinal fasciculus (MLF).

3^{RD} and 4^{th} cranial nerve nuclei are situated aruond the cluster of neurons of the midbrain and pontine portions of the ARAS. So coma due to brainstem damage, ocular motility is affected. Abnormal patterns of ocular motility will guide us to locate which part of brainstem is involved.

Principal causes of reduced wakefulness are,

1. Bilateral hemispherical damage.
2. Brainstem lesion that damages the reticular activating system which radiates perpendicular to the long axis of the brainstem.

RAS receives major somatic and sensory pathways. So integration along with other subcortical structures and cerebrum are key structures for maintaining the consciousness.

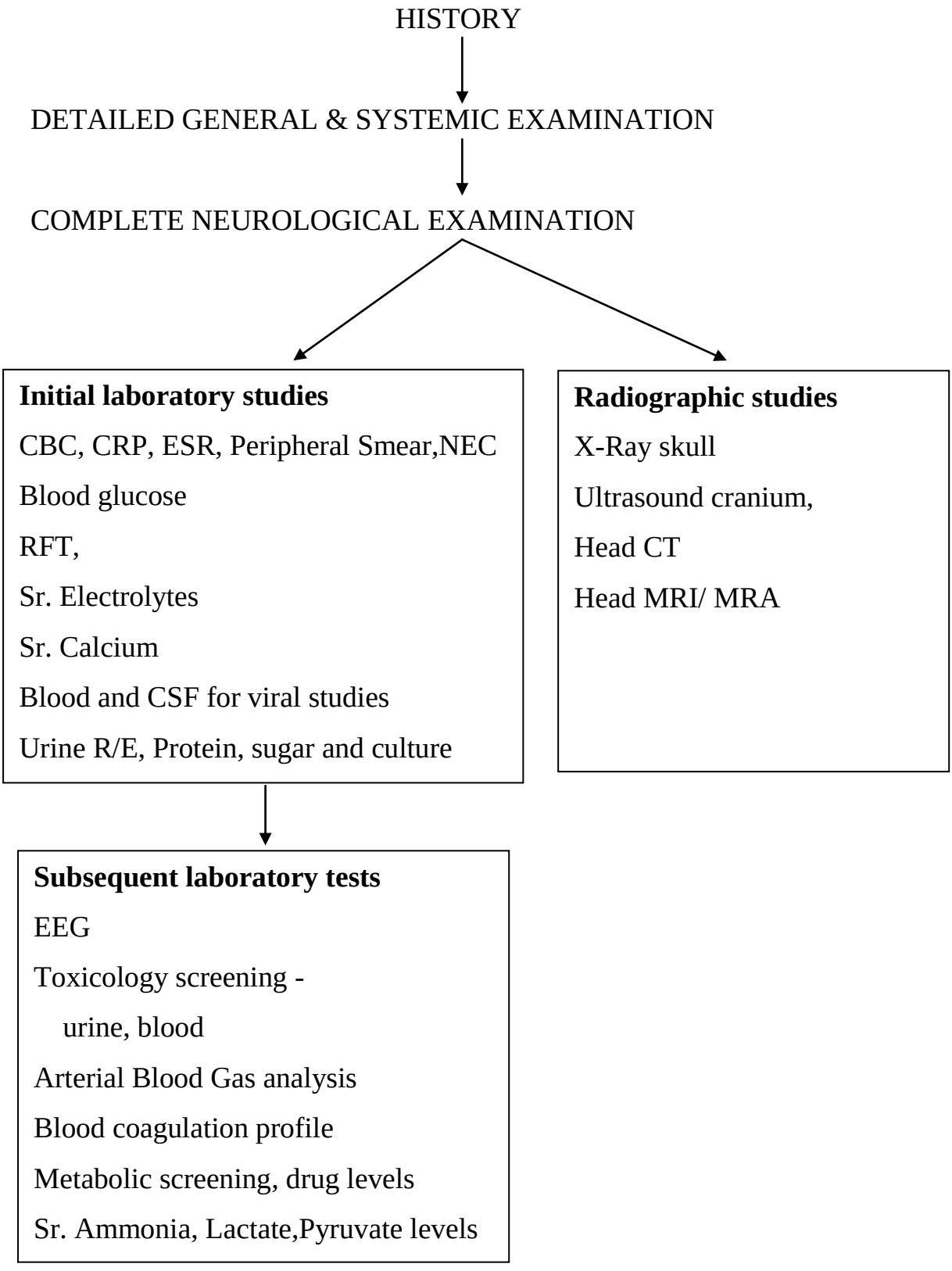
NEUROPHARMACOLOGICAL BASIS:

Central acetyl choline and monoamine system (serotonin, nor adrenaline) governing the arousal, cognition, stupor, coma of the individual.

In addition dopamine which is from substantia nigra may activate the aroused motor behavior.

GABA, inhibitory neurotransmitter from cortex which has negative feedback inhibition from RAS.

APPROACH


HISTORY
DETAILED GENERAL & SYSTEMIC EXAMINATION
COMPLETE NEUROLOGICAL EXAMINATION
Initial laboratory studies
CBC, CRP, ESR, Peripheral Smear,NEC
Blood glucose
RFT,
Sr. Electrolytes
Sr. Calcium
Blood and CSF for viral studies
Urine R/E, Protein, sugar and culture
Radiographic studies
X-Ray skull
Ultrasound cranium,
Head CT
Head MRI/ MRA
Subsequent laboratory tests
EEG
Toxicology screening -
urine, blood
Arterial Blood Gas analysis
Blood coagulation profile
Metabolic screening, drug levels
Sr. Ammonia, Lactate,Pyruvate levels

DEFINITIONS [7,8,9]

CONSCIOUSNESS:

State of awareness of self & surroundings.

DELIRIUM:

Delirium is an agitated and confusional state, in which the child responds incoherently and sometimes violently. The child may respond continuously but inappropriately without slipping into sleep.

DROWSY:

The child is sleeping but arousable by stimulus like a loud call or mild painful stimuli. The child responds appropriately without further stimulation, but will go to sleep again if left alone.

OBTUNDATION:

It is a state between drowsiness and stupor. Here the child might be awakened by a stronger stimulus other than pain, shows inappropriate response to the stimulus.

STUPOR:

Stupor is the unresponsive state from which the child could be aroused only by very strong and or with multiple stimuli.

COMA:

"The child is incapable of being aroused by any sort of external stimulus or internal stimuli".

IMPORTANT CAUSES OF ACUTE ENCEPHALOPATHY

1. STUCTURAL:

A.TRAUMA (excluded from this study) mentioned here for general causes of coma:

1. Extra dural haemorrage.
2. Subdural haemorrage / effusion.
3. Intraparenchymal hematoma.
4. Diffuse axonal injury.

B. Neoplasm:

C. Vascular diseases.

1. Brain parenchymal infarction due to thrombosis / embolism
2. Intracranial bleed (secondary to arterio-venous (AV) malformation or aneurysm of intracranial vessels.

D. CNS infection: meningitis, encephalitis.

2. METABOLIC – TOXIC:

A.HYPOXIC-ISCHEMIC:

1. Cardiovascular insufficiency /shock.
2. Respiratory failure / hypoxia.
3. Submersion injury.
4. Carbon monoxide (CO) toxicity.
5. Strangulation .
6. DIVC.
7. Status epilepticus
8. Cardiac arrhythmias.

B.INTRINSIC METABOLIC DISORDER

1. Hypoglycemia
2. Acidosis (DKA, Organic Acidemia, branched chain amino acidemia, Hyperammonemia (hepatic encephalopathy, Reye's syndrome, Urea Cycle Defects (UCD), Valproic acid poisoning).
3. Chronic renal failure / uremic encephalopathy.
4. Fluid and electrolyte abnormalities.
5. Endocrine disorders (Myxedma and Addison's disease).
6. Hypertensive encephalopathy.
7. Hypothermia.
8. Heat stroke.

C. EXOGENOUS TOXINS/POISONS:

1. Sedatives / Hypnotics.
2. Neuroleptics.
3. Aspirin.
4. Anticonvulsants.
5. Paracetamol.
6. Hydrocyanide poisoning.
7. Lead
8. Volatile hydrocarbons.
9. Neem oil/Camphor.
10. Snake/Scorpion bite- encephalopathy.
11. Antihistamines,
12. Antimetabolites
13. Alcohol.

D. INFECTIONS:

1. Meningitis,
2. Encephaitis / Cerebral malaria,
3. Cerebral abscess / Acute Disseminated Encephalo Myelitis (ADEM).

E. SEIZURES/STATUS EPILEPTICUS/NON CONVULSIVE STATUS EPILEPTICUS/ POST ICTAL STATES:

3. PSYCHOGENIC:

GRADES OF COMA

Stage 1 or stupor:

The patient can be aroused briefly and showing motor or verbal response to stimuli.

Stage 2 or light coma:

The patient can be aroused only by painful stimulus.

Stage 3 or deep coma:

There is no response to painful stimuli. The limbs may be in decorticate/ decerebrate posturing.

Stage 4 or brain death:

All cerebral functions are lost. Pupillary reflexes are lost. There is no spontaneous respiratory efforts and only local spinal reflexes are preserved.

DIFFERENTIAL DIAGNOSIS OF COMA

1. PERSISTENT VEGETATIVE STATE

Persistent vegetative state is a state of motionless living which occurs due to severe and diffuse injury due to traumatic or non traumatic insults. Loss of awareness of self and surroundings. This should be present for 1 month to diagnose this condition.

2. LOCKED IN SYNDROME:

This syndrome is due basilar artery thrombosis, pontine hemorrhage or tumor or central pontine myelinosis leads to pontine infarction and affecting PPRF, which produce impaired horizontal movements of eyes. In this condition patient is aware of self, and awake, able to perceive the sensory stimuli, able to move eyes vertically or blink or both but impairment of horizontal gaze. The differentiation from coma by intact RAS.

3. ABULIA:

Psychological state in which the patient is depressed, poor self esteem, apathetic, so they neither speak nor move spontaneously imitating the coma like state.

4. CATATONIA:

This could be organic or psychological in which the patient has drastic reduction/ absent of motor activity. Maintenance of body position differentiates from coma.

5. EUDOCOMA(HYSTERICAL UNRESPONSIVENESS):

ENCEPHALOPATHY:

Encephalopathy is a disorder of consciousness and applied to coma/ progressive worsening of consciousness from awake state to deep coma.

Arousal is lost in coma and impaired in encephalopathy.

COMA SCALES

1. CLINICAL STAGING SYSTEM
2. GLASGOW COMA SCALE
3. CHILDREN COMA SCALE
4. MODIFIED CHILDREN COMA SCALE

GLASGOW COMA SCALE

Total score is 15 and 3 is the minimum score. Score less than 8 needs aggressive management. GCS gives a rapid assessment of cerebral function.

GLASGOW COMA SCALE AND PEDIATRIC COMA SCALE [5,6]

Sign	General	Pediatric	Score
Eye opening	Spontaneous	Spontaneous	4
	To command	To sound	3
	To pain	To pain	2
	None	None	1
Verbal response	Oriented	Age appropriate sounds or orientation	5
	Confused, disoriented	Irritable but consolable, aware of the environment	4
	Inappropriate words	Irritable, not appropriately/ continuously consolable	3
	Incomprehensible sounds	Inconsolable, detatchment to the environment, agitated	2
	No response	No response	1
Motor response	Obeys commands	Obeys commands, move spontaneously	6
	Localizes pain	Localizes pain	5
	Withdrawl to pain	Withdrawl to pain	4
	Decorticate posture	Decorticate posture	3
	Decerebrate posture	Decerebrate posture	2
	No response	No response	1
	Maximum score	Maximum score	15

Glasgow coma scale which is classically applicable to adults depends on higher cognitive/integrative function cannot be extrapolated to in infants or younger children.

So, modification of Glasgow coma scale which applicable for infants and children less than 4 years of age becomes important in the management of coma in children.

MODIFIED COMA SCALE APPLICABLE FOR INFANTS & CHILDREN LESS THAN 4 YEARS

Babbles and coos	-	5
Irritable	-	4
Crying to pain	-	3
Moaning to pain	-	2
None	-	1

The best possible reaction to changes according to language development which influences a lot to maximal score. The maximum total score is adjusted to reflect maturation as follows:

Initial 6 months	09
6/12 to 1 year	11
1 year – 2 year	12
2 year – 5 year	13
> 5 year	14

CLINICAL STAGING IN ENCEPHALOPATHY

STAGE 1

Lethargic

Responds commands

Pupils reactive

Normal breathing

Normal muscle tone

STAGE 2

Combative

Inconsistently following commands

Sluggishly reacting pupils

Hyperventilation

Inconsistent reflexes

STAGE 3

Comatose

Occasional responds to command

Eye deviation

Irregular breathing

Decortication.

STAGE 4

Comatose

Respond to pain only

Weak pupillary response

Highly irregular breathing

Decerebration

STAGE 5

Comatose

No response to pain

pupillary response absent

Requirement of mechanical ventilation

Flaccid

A simple bedside assessment can be done by using the AVPU scale which is used in emergency room management.

SCALE:

ALERTNESS

RESPONSE TO **V**ERBAL COMMAND

RESPONSE ONLY TO **P**AIN

UNCONSCIOUSNESS

SIGNS OF LOCALISING VALUES IN COMA

Localization of structural lesions is very much important in assessing the prognosis.

Following examinations are useful to determine the depth of coma and localise the process leading to coma.

1) Level of consciousness (cortical function).
2) Breathing pattern (brainstem).
3) Pupillary size & reaction (brainstem).
4) Eye movements / gaze (brainstem).
5) Motor / involuntary movements (subcortical).

Brain stem includes midbrain, pons, medulla. Each part of the brain involvement has it's own presentation and sequence.

Cortical involvement:

Normal consciousness/ akinetic mutism (B/L cingulated gyrus) involvement, normal respiration/ post hyperventilation apnea, pupils normal, DEM present, hemiparesis, roving eye movement/look toward destructive lesion and away from paretic side..

Subcortical involvement:

Lethargic and apathetic (thalamus)/ drowsiness (hypothalamus), cheyne's stokes respiration, small reactive pupils, roving eye movement/look toward destructive lesion, DEM present, decorticate posture..

Midbrain involvement:

Comatose, central hyperventilation, midposition and pinpoint fixed (nuclear level), unilateral dilated & fixed (3^{rd} nerve), large & fixed (pretectal), downwards and outwards gaze, DEM absent/abnormal, decerebrate posture.

Pons/medulla involvement:

Comatose, apneustic/atactic respiration, unequal and small, reactive pupils, gaze away from the lesion & towards the paretic side, DEM absent/abnormal, decerebrate posture [1].

MANAGEMENT:

Detailed clinical / neurological examination at the time of presentation and during further course & understanding the patho-physiology is very important step in management of coma.

Neurological examination includes spino-motor system examination, pupil size & reactions, reflex eye movements, motor response, fundus examination.

Airway, breathing, circulation should be managed with prime importance. Perfusion to the brain parenchyma impacts the cerebral perfusion pressure and that influences the intracranial pressure.

Seizure management and specific treatment to the particular etiology like antibiotics, anti viral medications, antidotes, metabolic corrections / surgical correction should be done in timely manner.

INVESTIGATIONS:

1. Complete blood count.
2. Blood sugar, Serum Calcium.
3. ESR, CRP.
4. Blood & urine osmolarity.
5. Coagulation profile.

6. Bacteriological & virological studies (Culture, serology, PCR) in blood & CSF.
7. Mantoux.
8. Imaging studies – CT, MRI, USG.
9. Arterial Blood Gas.
10. Plasma pyruvate, Plasma Ammonia, Plasma lactate – For inborn errors of metabolism.
11. Urine & Blood – for drug level like anti-histamines, antidepressants, anticholinergics ,hypnotics & sedatives, analgesics, antimetobolites, anti epileptics ,alcohol, cannabis, opiates, cocaine.
12. Anticonvulsants level in blood if needed.
13. Urine metobolic screening (UMS) - To R/o Organic acidurias, Aminoacidopathies, Urea cycle defects, Mitochondriopathies.
14. CSF Analysis including cells, protein, sugar, c/s, gram staining, viral studies, PCR, etc.
15. Liver function test.
16. Thyroid function test & other endocrinological investigations – for DM, Hypoglycemia, DKA, Hypo & Hyperparathyroidism, myxoedema & thyrotoxicosis, hypoadrenalism, hypopituitarism.

TREATMENT :

ABC - Basic life saving airway, breathing and circulation management.

- Cervical immobilization depends upon the need: It should be carried out where there is any suspicion of cervical spine trauma. Traumatic coma is apart from the study. But anyhow in the management aspect that should be thought of.
- Consider Intubation if GCS is 8 or less than 8.
- Avoid neck movement, which may cause jugular venous obstruction.
- Head end rise of 15-30^{O} with neutral position to decrease the venous outflow pressure gradient.
- Sedation and neuromuscular blockade when needed.
- Maintain normal blood pressure with isotonic fluids and inotropic support, if warrented.
- Maintain body normo-thermia/ slightly hypothermia to reduce metabolic need of tissues.
- Inj. Mannitol 1.5 ml/kg - every 8th hourly to cerebral edema.
- Steroids – useful when focal edema around mass lesions and in bacterial meningitis.

- Catheterization into the ventricles – gives most accurate measurement of ICP and drainage of CSF in therapeutic aspect to reduce ICP.

MINIMAL HYPERVENTILATION – could help by cerebral vasoconstriction there by reduction in cerebral blood flow and volume, lowering ICP.

  - Maintain PCO2 at 25-35 mm Hg
  - Excessive hyperventilation may produce cerebral hypoperfusion and should be avoided.

- Bladder care : Intermittent Catheterization the bladder
- Bowel Care: Suppositories and oral lactulose to prevent constipation.
- Eye Care : Topical antibiotics & Artificial tear drops
- Back Care: Frequent change of the position & water bed.
- Specific treatment - to the etiology.

LONG TERM CARE AND PROGNOSIS:

- Duration of coma is the important parameter of long term disability.
- In EEG - Indicators for poor outcome are,
    1) Burst suppression pattern
    2) Low-voltage undifferentiated impressions.
    3) Electro cerebral inactivity

After the mechanical ventilation has weaned off with respiratory functions, and circulatory function has estabilized and ICP has normalized, immediate rehabilitation interventions like various sensory input stimulation techniques, occupational therapy, physiotherapy and speech therapies should be initiated.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Literature on pediatric non-traumatic coma in Indian scenario is very limited, that too is mostly retrospective. Information about non-traumatic coma particularly from developing countries like India is scarce.

Bansal A et al.PGIMER, Chandigarh, India, analysed 100 children with non traumatic coma. He observed etiology of coma were 60% infective (TBM - 19, pyogenic meningitis -16, meningo-encephalitis - 18, others causes-7), 19% - toxic/metabolic, 10% - status epilepticus, 7% - intracranial bleed, 4% - miscellaneous causes. Predictors and risk factors of mortality were age less than 3 years, weak pulse volume, papilloedema, abnormal EOM/ DEM at the time of presentation & after 2 days of admission. Mortality was 35 %.[10].

Saba Ahmed et al. Civil Hospital, Karachi, analysed 100 cases of coma and his observation were 65% infective, 9% metabolic, 5% status epilepticus, 5% poisoning,16% others. Predictors and risk factors of mortality were hypothermia, low BP, abnormal breathing pattern and pupillary reaction, severe hypotonia and hyporeflexia. There was 35% mortality in this study.[11,12,13,14.]

RC Ibekwe et al.Abakaliki, Ebonyi State, Nigeria, analysed 40 cases of coma. 85% were due to infective causes and 15% of other causes. GCS score of 8 or below 8 were the risk factors in this study and there was 32% mortality[15.]

Nayana PP et al. Department of Pediatrics, JIPMER, Pondicherry, India, conluded "In acute non-traumatic coma, Modified Glascow Coma Scale (MGCS), is not useful to predict long term outcome. However, verbal response, one of a component of MGCS, associates well with long term outcome"[16].

Awasti et al, analysed about the predictors of mortality in children with non traumatic coma in 230 patients and found that, 42.2% had bacterial meningitis, 36.9% had TBM and 20.9% had encephalomyelitis with meningeal involvement. 43 children were (18.7%) expired. Of which 45% of children expired within 3 days. Day 1 aggregate GCS score correlated well with the mortality. He concluded that the MGCS can be used to assess the time of discharge in patients with non traumatic coma with infective causes within 24 hours of presentation. This system of assesment is simple can be applied at the bedside and does not depend on any complicated issues. In developing countries like India with limited resources, it can be

used for early identification and referral of patients to higher centres depends on the degree of severity. The predictive value of the MGCS is validated by this study [13].

Sofiah A et al analysed 116 children with non traumatic coma . The various causes include meningitis in 80 (69%) children ,6 (5%) to hypoxic ischaemic insults, 4 (3.5%) had intracranial bleed, fifteen (13%) to toxic metabolic causes, 9 (7.8%) were due to other causes and in 2 (1.7%) the cause was undiagnosed. Seven children had failed in follow up. Of the remainder, thirty nine children (35.7%) expired, thirty two children (29.3%) had permanent neurological sequelae, and thirty eight (35%) children were went home well. The outcome was poor in the infections group .The outcome was not affected significantly by age of onset and sex [14].

Stevens RD et al stated, severe dysfunction or injury involving the cerebrum, subcortical areas of the brain parenchyma, diencephalon, brainstem structures could lead to coma and related problems of consciousness. Range of involvement determines the severity, disability and mortality. Treatment of coma includes proper initial stabilization of vital functions in order to prevent subsequent neurologic disability, early diagnosis and proper intervention to the

corresponding etiology. Underlying basis etiology and pathophysiology and presenting clinical assessment and imaging studies, electrophysiological tests determines the final outcome[17].

Seshia SS et al analysed, 104 children were referred to the neurology department of a higher institute with non-traumatic coma. Twelve clinical parameters were included in the orderly procedure. 7 of these were coma severity, EOM, pupilary reactions, motor involvement, BP, temperature and type of seizures, were included and studied 1) the time of presentation, (2) after 24 hours of coma. He found the data suggest that early clinical assessment and parameters when compared to the 24 hours assessment, correlates well with final outcome. But both had relationship with outcome[18].

Löhr Junior A, et al analysed about the etiology and the morbi-mortality of pediatric patients in acute coma, hospitalized at the Intensive Care. The study comprised 104 children. They concluded that one third of the children were died, one third presented neurological sequelae, and one third presented no further complications [19].

The incidence of coma in children under 12 years varies from place to place. **Wong CP** et el study[2] on "Incidence etiology and outcome of coma", stated that the incidence of coma is 30.8 per 100 000 children < 16 per year. First year of life (160 per 100 000 children per year), that too early part of infancy contributing more incidence.

In **Sofiah A**., Hussain I. H. M. et el [3] studies on Non traumatic coma, 69% were due to infection, 13% were due to toxic metabolic causes, 5% were due to hypoxic ischaemic insults, 3.5% had intracranial haemorrhage, around 8% were due to other etiologies and in 1.7% the cause was unknown. The final outcome was not significantly affected by age of onset and sex in this study also.

Stevens and **Bharadwaj** et el [4] reviewed all the presently available studies about the nontraumatic coma and their cause, and clinical parameters, final outcome, and stated that an evidence-based protocol for the clinical management of the such patients. They tried to estimate how much the simple clinical signs can be used to assess the underlying patholody and it's severity and relation to the final outcome. Seshia SS, Johnston B, Kasian G et el [5] showed the data suggest that early clinical assessment and parameters when compared

to the 24 hours assessment, correlates well with final outcome. But both had statistically significant relationship with outcome.

According to a study conducted by **Lohr Junior A** et el [6],done to study the etiology, morbidity and mortality of coma in children,31 (29.8%) of the cases were due to meningo-encephalitis,24 (23.1%) to an epileptic condition, 19 (18.3%) were toxic-metabolic, 16 (15.4%) to intra-cranial hypertension, 7 (6.7%) to shock/anoxia, 4 (3.8%) to an indeterminate etiology and 3(2.9%) were miscellaneous.

According to a study conducted by **Aswati** et al[8], a study about value of MGCS to predict the mortality in patients with acute CNS infection along with other clinical variables, they found that MGCS could be used to know the severity of the presenting status, progression, time of discharge and final outcome and probable neurological sequelae, with that simple clinical parameter only.

A **Tatman** & **Williams** et al [9] showed in their study that James' adaptation of the Glasgow coma scale (JGCS) was initially introduced for younger age group of children. In contrast to the MGCS scale, verbal score was not put for mechanically ventilated children. Thereafter equal parameter of grimace score had come to for mechanically ventilated children.

AIM OF THE STUDY

AIM OF THE STUDY

- To identify the etiology and outcome of non traumatic coma in children admitted in the pediatric intensive care unit of our hospital.
- To identify the risk factors for mortality in children with non traumatic coma.

STUDY JUSTIFICATION

- Reasonable steps have to be taken to avoid or minimize permanent brain damage from reversible causes of coma.
- The outcome of the coma depends upon the etiology and risk factors.
- Identification of those risk factors will help us to reduce the mortality and severity of the morbidity. There was not a optimal study to identify the risk factors and for clinical profile for non-traumatic coma.
- Literature from south Indian data about risk factors and clinical profile for non traumatic coma are few.
- Outcome of this study will help us to identify the the common causes, and risk factors associated with non-traumatic coma. Thus reduces the mortality and morbidity by effective interpretation and management according to results obtained by this study.
- This data would help to make a prompt diagnosis and plan interventions which can reduce mortality and morbidity in non traumatic coma.

OBJECTIVES

- To estimate the incidence of non-traumatic coma.
- To identify the etiology & clinical features and outcome of non-traumatic coma.
- To identify risk factors associated with non traumatic coma
- To find the chances of reducing the mortality and the maximum morbidity of coma by statistical analysis of the above information.

MATERIALS AND METHODS

MATERIALS AND METHODS

STUDY CENTRE:

The study was conducted in the Institute of Child Health and Hospital for children, Egmore, Madras medical college, Chennai**.**

STUDY PERIOD:

The study was carried out prospectively from January 2012 to December 2012.

STUDY DESIGN:

Descriptive study.

STUDY POPULATION:

Children admitted with clinical symptoms and signs of coma in Pediatric intensive care unit (PICU), Institute of Child Health and Hospital for children (ICH & HC), Madras medical college Egmore, Chennai.

SAMPLE SIZE : 100 Children.

INCLUSION CRITERIA:

Children aged between 2 months- 12 years fulfilling the definition of coma.

EXCLUSION CRITERIA:

1) Coma due to head trauma.
2) Child treated outside PICU prior to the ICH admission.

CONFLICT OF INTEREST : Nil

FINANCIAL SUPPORT : Nil

ETHICAL COMMITTEE CLEARANCE: Obtained.

METHODOLOGY:

- **Coma** defined in this study is GCS score of below 8.
- The patients will be enrolled on the basis of inclusion criteria and after obtaining written informed consent from the parents.
- The inclusion criteria will be 2months – 12 years children with non traumatic coma admitted in PICU, ICH & HC and children treated outside PICU will be excluded.
- After admission child will be examined, relevant investigations done and appropriate treatment given according to standard guidelines.

- Complete physical examination and detailed neurological examination including the GCS will be done.
- Parent counseling will be done every day throughout the hospital stay.
- Investigations like blood, urine if needed CSF and imaging studies like USG, CT scan, MRI will be taken according to the unit protocol.
- This may include blood (complete blood count (CBC), Peripheral smear, Erythrocyte Sedimentation Rate (ESR), Sugar, Electrolytes, Urea, Creatinine, Calcium, Non Enteric Culture (NEC), Liver Function Test (LFT) , Lactate, Pyruvate, Ammonia ,urine (Albumin, Sugar, Bile salts, Bile pigments, Ketone bodies) CSF analysis (including cell count, sugar, Protein, c/s, Gram's stain, Acid Fast Bacilli (AFB), ABG, X-Ray-Chest, skull, EEG, CT SCAN, MRI , etc.
- Investigations will be done at institute of child health, Kings institute for virology for viral studies and culture and PCR.
- The cause of non traumatic coma is elucidated by clinical finding and confirmed by investigations.

- Diagnosis will be categorized as following by standard definitions: Infections/sepsis, Metabolic, Epilepsy/Seizure Disorder, Vascular/ Hematological, Toxins/Poisons, Stuctural, other causes.

- Treatment will be given according to standard protocol and guidelines.

- Expected outcome will be, complte recovery, recovery with deficits or death .

- This data will be collected and will be put into statistical analysis for study report.
- The principal investigator will complete the data collection form at the time of admission at PICU and children will be followed up till the outcome-death/discharge.

CASE DEFINITIONS/ EXPLANATION IN THIS STUDY:

COMA:

GCS score of below 8.

PYOGENIC MENINGITIS:

Acute febrile encephalopathy associated with positive CSF culture or presence of the 2 of the following findings in CSF – Polymorpho -nuclear cells or glucose <40mg/dl / more than half of the blood sugar taken at the time of lumbar puncture (LP) / positive Gram stain.

TUBERCULOUS MENINGITIS (TBM):

Child with features suggestive of meningitis, with increased CSF cells with lymphocyte predominance and Tubercle Bacilli on AFB staining/ absence of bacteria on direct microscopy, increased proteins, CT Brain features s/o TB- basal meningitis, hydrocephalus, prominent basal cisterns.

VIRAL MENINGOENCEPHALITIS:

Acute encephalitic syndrome with increased CSF cells with lymphocyte predominance and increased protein with normal sugar with positive blood / CSF viral studies.

HYPERTENSIVE ENCEPHALOPATHY:

Encephalopathy in association with hypertension (BP of above 95th percentile) for the age and sex with or without fundal changes in opthalmoscopy.

HYPOXIC ISCHEMIC ENCEPHALOPATHY:

Encephalopathy following ischemic/ hypoxic brain injury like submersion injury, post cardiac arrest, near fatal asthma, etc.

TOXIC/POISON ENCEPHALOPATHY:

Encephalopathy following intake of toxins/ poisonous substances like neem oil, OPC, native medications of unknown nature, kerosene ingestion, scorpion sting , snake bite, other CNS toxic drugs .

METOBOLIC ENCEPHALOPATHY:

Coma due to pure metabolic etiology like DKA, IEM without direct evidence of infection, trauma, vascular cause.

HEPATIC ENCEPHALOPATHY [4]:

Encephalopathy with or without coagulopathy seen in patients with liver pathology after exclusion of pure neurological and metabolic abnormalities.

INTRACRANIAL BLEED:

Children with coma with evidence of bleeding inside the CNS stuctures on neuro imaging.

In this study general examination (pulse rate, respiratory rate, temperature, blood pressure, weight, head circumference), lab evidence/ investigation results (sugar, electrolytes), clinical features/ neuro imaging (cerebral edema) are considered in the following way for the practical purpose.

Pulse rate, respiratory rate, blood pressure, are entered as high/ normal/ low according to the age and sex. If the child with apnea, entered as apnea only. Temparatue more than 38.4 degree Celsius considered as fever and below 36 degree Celsius considered as hypothermia.

For weight WHO chart is used. If more than 2 standard deviation below the normal range considered as low. For Head Circumference more than 3 standard deviation below the normal range considered as microcephaly and more than 2 standard deviation above the normal range considered as macrocephaly.

For total count >11000 considered as leucocytosis and < 4000 considered as leucopenia. Platelet count <100000 , considered as thrombocytopenia. Random blood sugar <50 mg/dl considered as hypoglycemia, >180 considered as hyperglycemia. For electrocytes sodium >150 Meq/L – high, <130 Meq/L – low, potassium > 5.5 Meq/L – high, <3.5 Meq/L – low.

STATISTICAL METHODS:

The data collected are entered in the data collection form and plotted in the properly prepared excel sheet. Data analysis was done using Epidemiological Information Package 17.

Using this software, frequencies, means, percentages, standard deviations, Chi- square, coefficient of correlation values and 'p' value were calculated. Chi- square test was used to estimate the significance of difference between quantitative variables. For qualitative variables, Yate's test was used. A 'p' value less than 0.05 is being taken as significant relationship. If the coefficient of correlation (r) is more than 0.5 then the two variables are taken to be correlated.

ANALYSIS:

Data will be spread in excel sheet and analysed using simple descriptive statistics.

RESULTS

RESULTS

100 children were enrolled into the study, those who fulfilled the inclusion criteria.

TABLE – 1

AGE GROUP AND OUTCOME

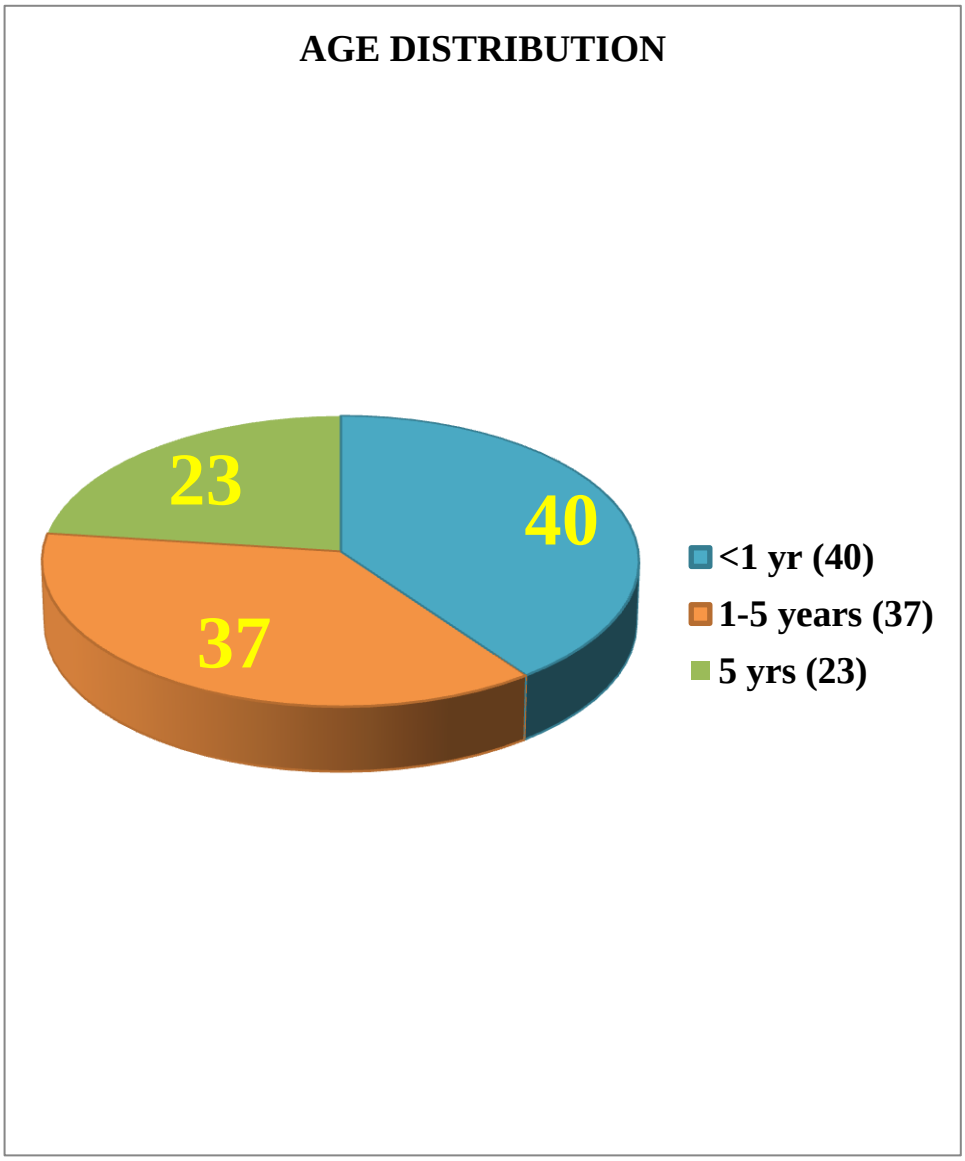
RwoD – Recovered without disability

RwD- Recovered with disability

Age group		Outcome			Total
		RwoD	RwD	Expired	
< 12 months	n (%)	11 (27.5%)	9 (22.5%)	20 (50%)	40 (100%)
12 – 60 months	n (%)	18 (48.6%)	7(18.9%)	12 (32.4%)	37 (100%)
>60 months	n (%)	15 (65.2%)	1(4.3%)	7(30.4%)	23 (100%)
Total	n (%)	44 (44%)	17(17%)	39 (39%)	100(100%)

Chi-square value = 10.050 P-value = 0.04 Significant

40 % of the children were infants, in which 50% (20/40) were expired. In 1-5 years of age around 49% (18/37) were recovered without disability. 32% (12/37) children were expired. >5 years - 65% (15/23) children were recovered without disability. Infants had a higher mortality..


AGE DISTRIBUTION
23
40
37
<1 yr (40)
1-5 years (37)
5 yrs (23)

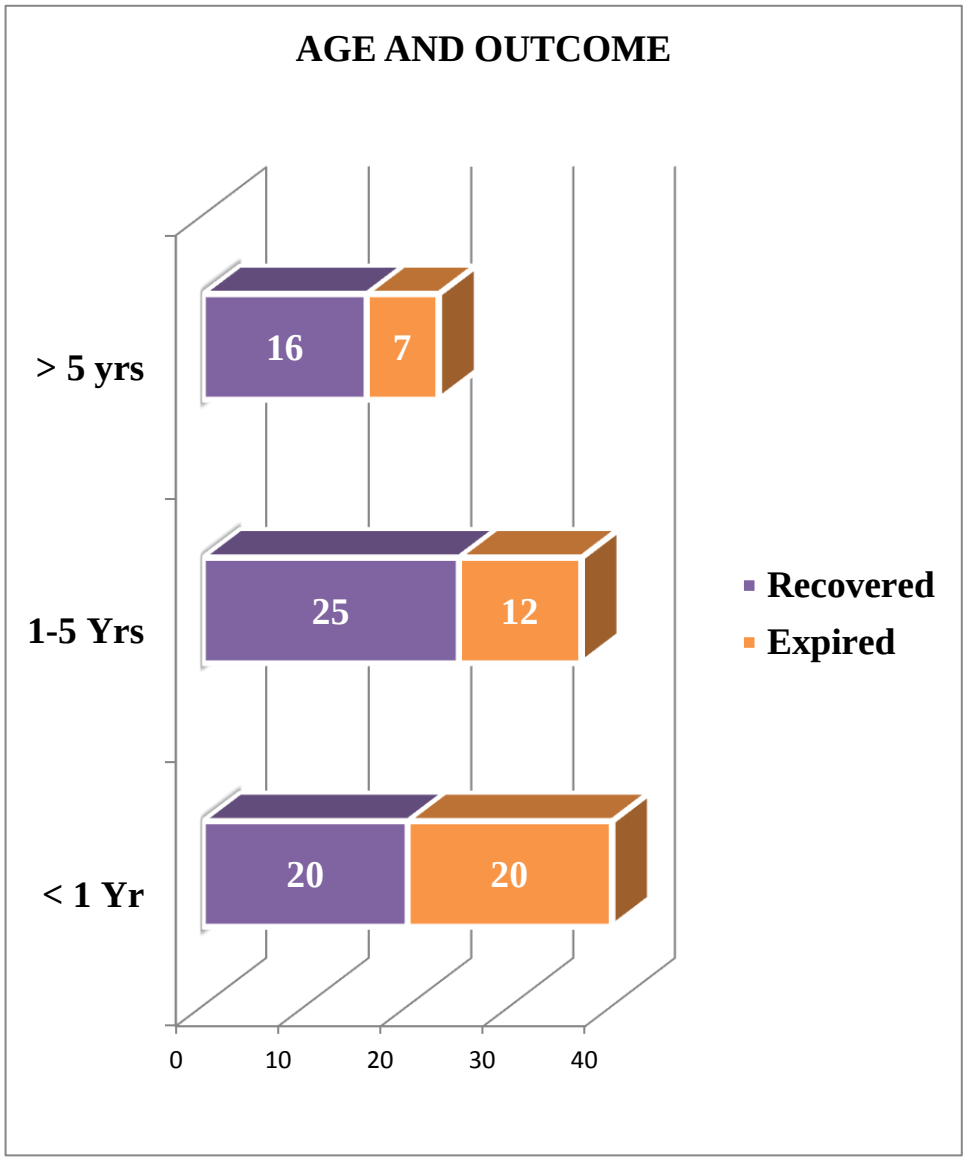

AGE AND OUTCOME
> 5 yrs
1-5 Yrs
< 1 Yr
16
7
25
12
20
20
0
10
20
30
40
Recovered
Expired

TABLE-2

GENDER AND OUTCOME

Gender		Outcome			Total
		RwoD	**RwD**	**Expired**	
Male	n (%)	23 (47.9%)	8(16.7%)	17 (35.4%)	48(100%)
Female	n(%)	21 (40.4%)	9 (17.3%)	22 (42.3%)	52(100%)
Total	n (%)	44(44%)	17 (17%)	39(39%)	100 (100%)

Chi-square value = 0.632 P-value = 0.729 NS

Of the 100 children, 48 were males and 52 were females. 35.4% (17/48) of male children and 42.3% (22/52) of female children expired.

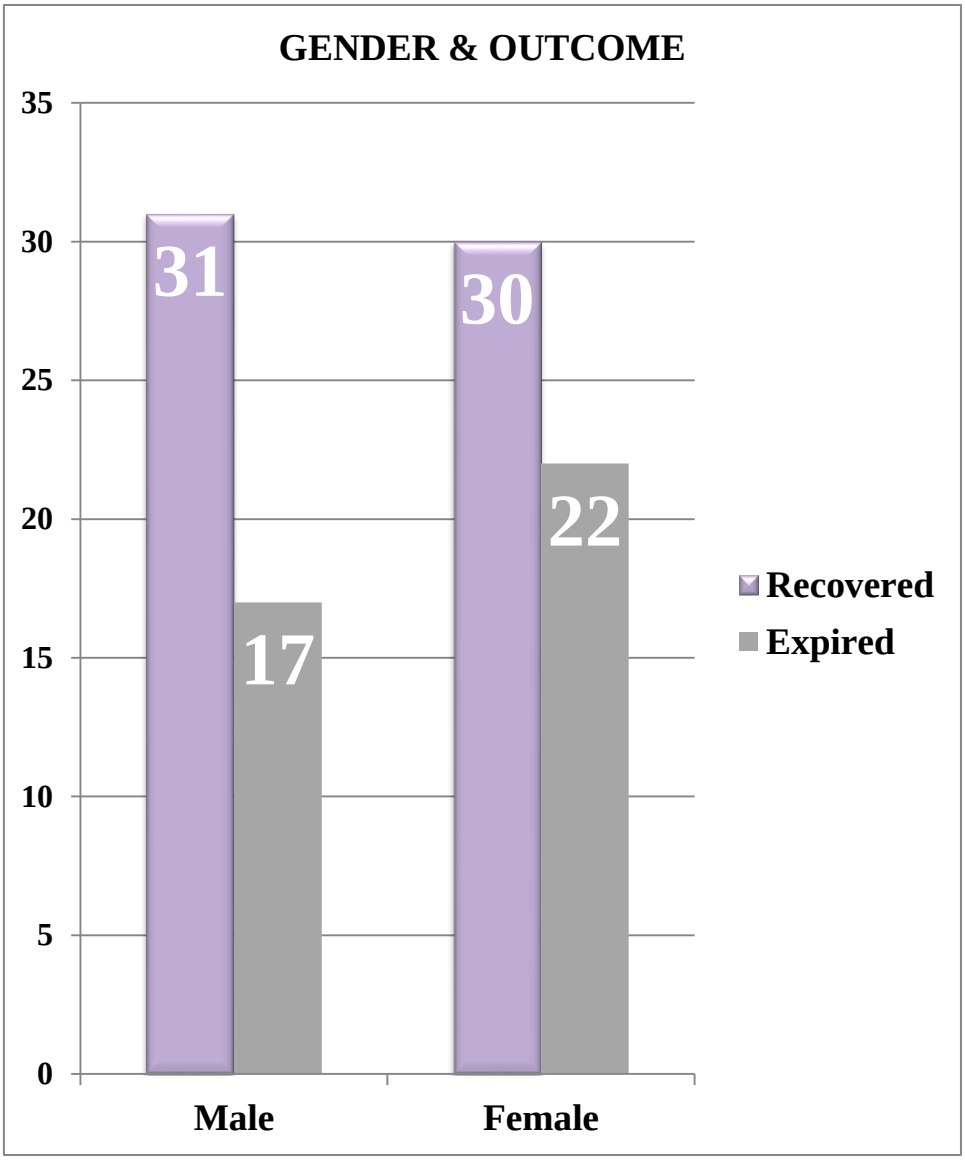

GENDER & OUTCOME
35
30
25
20
15
10
5
0
31
17
30
22
Male
Female
Recovered
Expired

TABLE – 3

TEMPERATURE AND OUTCOME

Temperature		Outcome			Total
		RwoD	RwD	Expired	
Normal	n (%)	31 (50.8%)	11 (18%)	19 (31.1%)	61 (100%)
Hyperthermia	n (%)	13 (40.6%)	5 (15.6%)	14 (43.8%)	32 (100%)
Hypothermia	n(%)	0 (0%)	1 (14.3%)	6 (85.7%)	7 (100%)
Total	n (%)	44 (44%)	17 (17%)	39 (39%)	100(100%)

Chi-square value = 8.978 P-value = 0.062 NS

61% were normothermic at admission, in which 69% (42/61) were recovered with or without disability. 7% were hypothermic, in which 86% (6/7) were expired. So, hypothermia was significantly associated with mortality in this study.

TABLE-4

PULSE RATE AND OUTCOME

Pulse Rate		Outcome			Total
		RwoD	RwD	Expired	
Normal	n (%)	23 (57.5%)	8 (20%)	9 (22.5%)	40 (100%)
Tachycardia	n (%)	21 (36.2%)	9 (15.5%)	28 (48.3%)	58 (100%)
Hypothermia	n (%)	0 (0%)	0 (0%)	2 (100%)	2 (100%)
Total	n (%)	44 (44%)	17 (17%)	39 (39%)	100 100%)

Chi-square value = 9.944 P-value = 0.041 Significant

78% (31/40) children with normal pulse rate were recovered with or without disability.

2% were presented with bradycardia, both of them expired. Bradycardia was found to be associated with poor outcome.

TABLE-5

RESPIRATORY RATE AND OUTCOME

Respiratory Rate		Outcome			Total
		RwoD	RwD	Expired	
Normal	n (%)	18 (52.9%)	5 (14.7%)	11 (32.4%)	34 (100%)
Tachypnea	n (%)	19 (45.2%)	10 (23.8%)	13 (31%)	42 (100%)
Bradypnea	n (%)	4 (100%)	0 (0%)	0 (0%)	4 (100%)
Apnea	n (%)	3 (15%)	2 (10%)	15 (75%)	20 (100%)
Total	n (%)	44 (44%)	17 (17%)	39 (39%)	100(100%)

Chi-square value = 19.102 P-value = 0.004 Significant

20% children were apneic at presentation, among them 75% (15/20) expired.

TABLE-6

BLOOD PRESSURE AND OUTCOME

Blood pressure		Outcome			Total
		RwoD	RwD	Expired	
Normal	n (%)	37 (53.6%)	14 (20.3%)	18 (26.1%)	69 (100%)
Hypertension	n (%)	3 (42.9%)	0 (0%)	4 (57.1%)	7 (100%)
Hypotension	n (%)	4 (19%)	3 (14.3%)	14 (66.7%)	21 (100%)
Total	n (%)	44 (45.4%)	17 (17.5%)	36 (37.1%)	97 (100%)

Chi-square value = 13.866 P-value = 0.008 Significant

69% children presented with normal BP only, among them 74% (51/69) were recovered with or without disability. 21% were hypotensive. Among them, 2/3 (14/21) were expired. Abnormal BP either hypertension or hypotension was associated with worse outcome.

TABLE-7

WEIGHT AT PRESENTATION AND OUTCOME

Weight		Outcome			Total
		RwoD	RwD	Expired	
Normal	n (%)	29 (37.7%)	12 (15.6%)	36 (46.8%)	77 (100%)
Low	n (%)	15 (65.2%)	5 (21.7%)	3 (13%)	23 (100%)
Total	n (%)	44 (44%)	17 (17%)	39 (39%)	100(100%)

Chi-square value = 8.611 P-value = 0.013 Significant

77% of children were in normal weight.

TABLE-8

HEAD CIRCUMFERENCE AND OUTCOME

HC		Outcome			Total
		RwoD	RwD	Expired	
Normal	n (%)	37 (42%)	17 (19.3%)	34 (38.6%)	88 (100%)
Microcephaly	n (%)	7 (58.3%)	0 (0%)	5 (41.7%)	12 (100%)
Total	n (%)	44 (44%)	17 (17%)	39 (39%)	100 (100%)

Chi-square value = 2.980 P-value = 0.225 NS

88% of children had normal head circumference only.

TABLE-9

GCS SCORE AND OUTCOME

GCS Score		Outcome			Total
		RwoD	RwD	Expired	
3	n (%)	0 (0%)	0 (0%)	3 (100%)	3 (100%)
4	n (%)	0 (0%)	0 (0%)	9 (100%)	9 (100%)
5	n (%)	2 (18.2%)	0 (0%)	9 (81.8%)	11 (100%)
6	n (%)	18 (56.2%)	9 (28.1%)	5 (15.6%)	32 (100%)
7	n (%)	24 (53.3%)	8 (17.8%)	13 (28.9%)	45 (100%)
Total	n (%)	44 (44%)	17 (17%)	39 (39%)	100(100%)

Chi-square value = 37.468 P-value = 0.000 Significant

GCS score of 3 and 4 were associated with 100% mortality. With the GCS score of 5, 82% (9/11) mortality. GCS score of 6 and 7 had better outcome compared to score of 3 to 5. Low GCS score at presentation showed association with mortality with statistical significance.

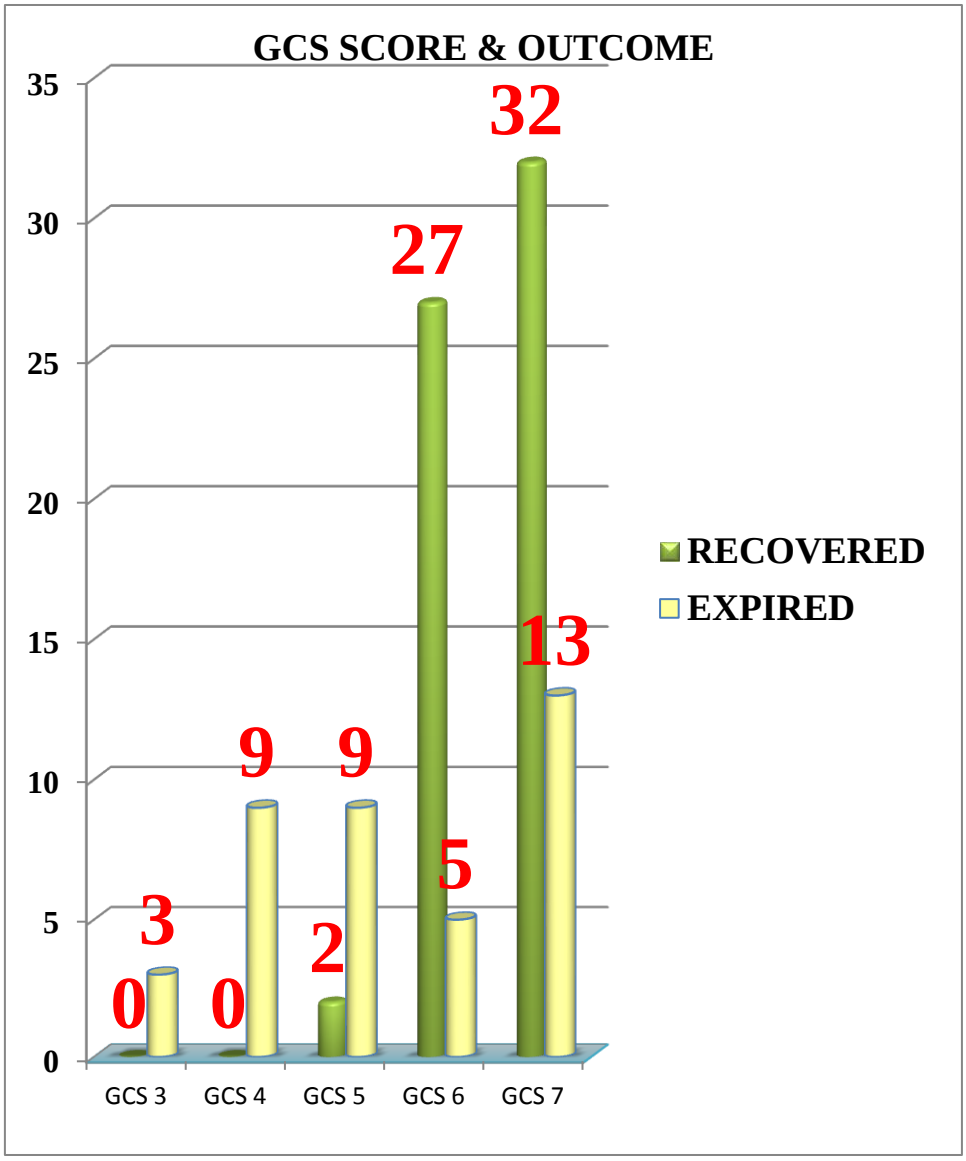

GCS SCORE & OUTCOME
35
30
25
20
15
10
5
0
32
27
13
9
9
5
3
2
0
0
GCS 3
GCS 4
GCS 5
GCS 6
GCS 7
RECOVERED
EXPIRED

TABLE-10

PUPILS REACTIONS AND OUTCOME

Pupils Reactions		Outcome			Total
		RwoD	RwD	Expired	
Reactive	n (%)	31 (50%)	11 (17.7%)	20 (32.3%)	62 (100%)
Non Reactive	n (%)	7 (23.3%)	5 (16.7%)	18 (60%)	30 (100%)
Sluggishly Reactive	n (%)	6 (75%)	1 (12.5%)	1 (12.5%)	8 (100%)
Total	n (%)	44 (44%)	17 (17%)	39 (39%)	100(100%)

Chi-square value = 10.839 P-value = 0.028 Significant

62% of children presented with normal papillary reaction at presentation, among which 50% (31/62) recovered without any neurological sequelae. 60% (18/30) of children who presented with non reactive pupils expired.

TABLE-11

DOLL'S EYE MOVEMENT AT ADMISSION AND OUTCOME

DEM		Outcome			Total
		RwoD	RwD	Expired	
Present	n (%)	22 (78.6%)	3 (10.7%)	3 (10.7%)	28 (100%)
Absent	n (%)	18 (37.5%)	11 (22.9%)	19 (39.6%)	48 (100%)
Defective	n (%)	4 (16.7%)	3 (12.5%)	17 (70.8%)	24 (100%)
Total	n (%)	44 (44%)	17 (17%)	39 (39%)	100(100%)

Chi-square value = 26.051 P-value = 0.0 Significant

89% (25/28) of children presented with intact doll's eye movement (DEM), recovered with or without disablility. Absent DEM/ defective DEM was found to be associated with worse outcome.

TABLE-12

CEREBRAL EDEMA AND OUTCOME

Cerebral Edema		Outcome			Total
		RwoD	RwD	Expired	
Present	n (%)	18 (34%)	15 (28.3%)	20 (37.7%)	53 (100%)
Absent	n(%)	26 (55.3%)	2 (4.3%)	19 (40.4%)	47 (100%)
Total	n (%)	44(44%)	17 (17%)	39(39%)	100 (100%)

Chi-square value = 11.101 P-value = 0.004 Significant

55% (26/47) of children without cerebral edema recovered without disability.

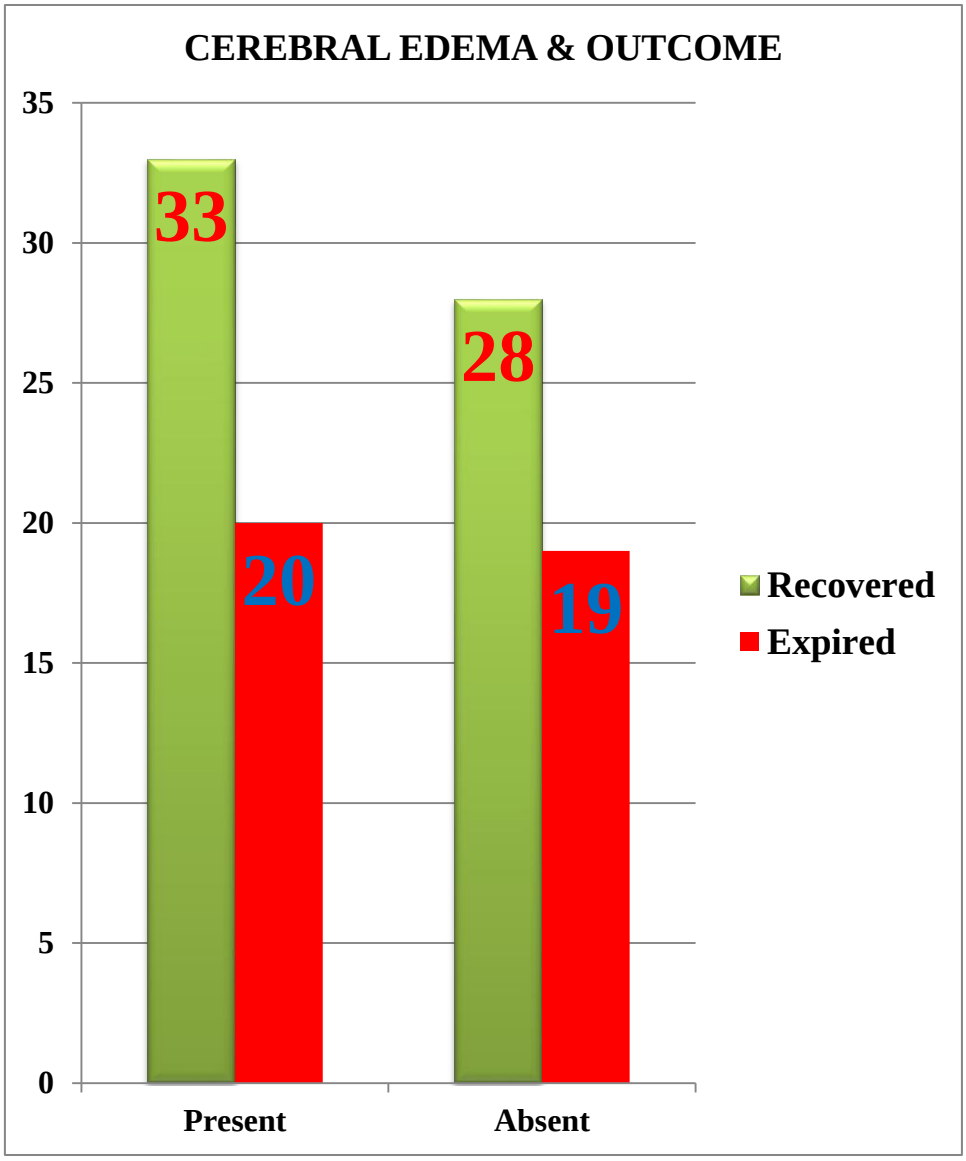

CEREBRAL EDEMA & OUTCOME
35
30
25
20
15
10
5
0
33
20
28
19
Present
Absent
Recovered
Expired

TABLE-13

CT SCAN AND OUTCOME

CT Scan		Outcome			Total
		RwoD	RwD	Expired	
Normal	n (%)	10 (71.4%)	2 (14.3%)	2 (14.3%)	14 (100%)
Abnormal	n(%)	11 (25%)	12 (27.3%)	21 (47.7%)	44 (100%)
Total	n (%)	21 (36.2%)	14 (24.1%)	23 (39.7%)	58 (100%)

chi-square value = 10.060 P-value = 0.007 Significant

76% (44/58) of children had abnormal CT scan findings. 86% (12/14) of children with normal imaging recovered with or without disability. Among them 72% (10/14) recovered completely without any disability. 47.7% (21/44) children with abnormal CT scan findings, expired.

TABLE-14

TOTAL COUNT AND OUTCOME

Total count		Outcome			Total
		RwoD	RwD	Expired	
Low	n (%)	0 (0%)	0 (0%)	5 (100%)	5 (100%)
Normal	n (%)	33 (55%)	6 (10%)	21 (35%)	60 (100%)
High	n (%)	11 (31.4%)	11 (31.4%)	13 (37.1%)	35 (100%)
Total	n (%)	44 (44%)	17 (17%)	39 (39%)	100 (100%)

Chi-square value = 17.020 P-value = 0.002 Significant

Only 5% of children were leucopenic and all of them (100%) expired. Low leucocyte count had significant association with mortality.

TABLE-15

PLATELET COUNT AND OUTCOME

Platelet Count		Outcome			Total
		RwoD	RwD	Expired	
Low	n (%)	8 (26.7%)	4 (13.3%)	18 (60%)	30 (100%)
Normal	n(%)	36 (51.4%)	13 (18.6%)	21 (30%)	70 (100%)
Total	n (%)	44(44%)	17 (17%)	39(39%)	100(100%)

Chi-square value = 8.111 P-value = 0.017 Significant

30% of children presented with thrombocytopenia, out of which 60% (18/30) expired, had a statistical correlation.

TABLE-16

BLOOD SUGAR AT PRESENTATION AND OUTCOME

Blood sugar		Outcome			Total
		RwoD	RwD	Expired	
Normal	n (%)	38 (42.2%)	16 (17.8%)	36 (40%)	90 (100%)
High	n (%)	5 (100%)	0 (0%)	0 (0%)	5 (100%)
Low	n (%)	1 (20%)	1 (20%)	3 (60%)	5 (100%)
Total	n (%)	44 (44%)	17 (17%)	39 (39%)	100 (100%)

Chi-square value = 7.730 P-value = 0.102 NS

Both hyperglycemic and hypoglycemic were 5% each. 100% (5/5) of hyperglycemic children recovered without disability. 60% (3/5) of hypoglycemic were expired.

TABLE-17

ELECTROLYTES AT PRESENTATION AND OUTCOME

SODIUM AND OUTCOME

Sodium		Outcome			Total
		RwoD	RwD	Expired	
Normal	n (%)	43 (47.3%)	16 (17.6%)	32 (35.2%)	91 (100%)
High	n (%)	0 (0%)	1 (16.7%)	5 (83.3%)	6 (100%)
Low	n (%)	1 (33%)	0 (0%)	2 (66.7%)	3 (100%)
Total	n (%)	44 (44%)	17 (17%)	39 (39%)	100 (100%)

Chi-square value = 7.421 P-value = 0.115 NS

TABLE-18

POTASSIUM AND OUTCOME

Potassium		Outcome			Total
		RwoD	RwD	Expired	
Normal	n (%)	36 (42.9%)	17 (20.2%)	31 (36.9%)	84 (100%)
High	n (%)	2 (40%)	0 (0%)	3 (60%)	5 (100%)
Low	n (%)	6 (54.5%)	0 (0%)	5 (45.5%)	11 (100%)
Total	n (%)	44 (44%)	17 (17%)	39 (39%)	100 (100%)

Chi-square value = 4.337 P-value = 0.362 NS

TABLE-19

BICARBONATE AND OUTCOME

Bicarbonate		Outcome			Total
		RwoD	RwD	Expired	
Normal	n (%)	41 (47.1%)	17 (19.5%)	29 (33.3%)	87 (100%)
Low	n(%)	3 (23.3%)	0 (0%)	10 (76.9%)	13 (100%)
Total	n (%)	44(44%)	17 (17%)	39 (39%)	100(100%)

Chi-square value = 9.537 P-value = 0.008 Significant

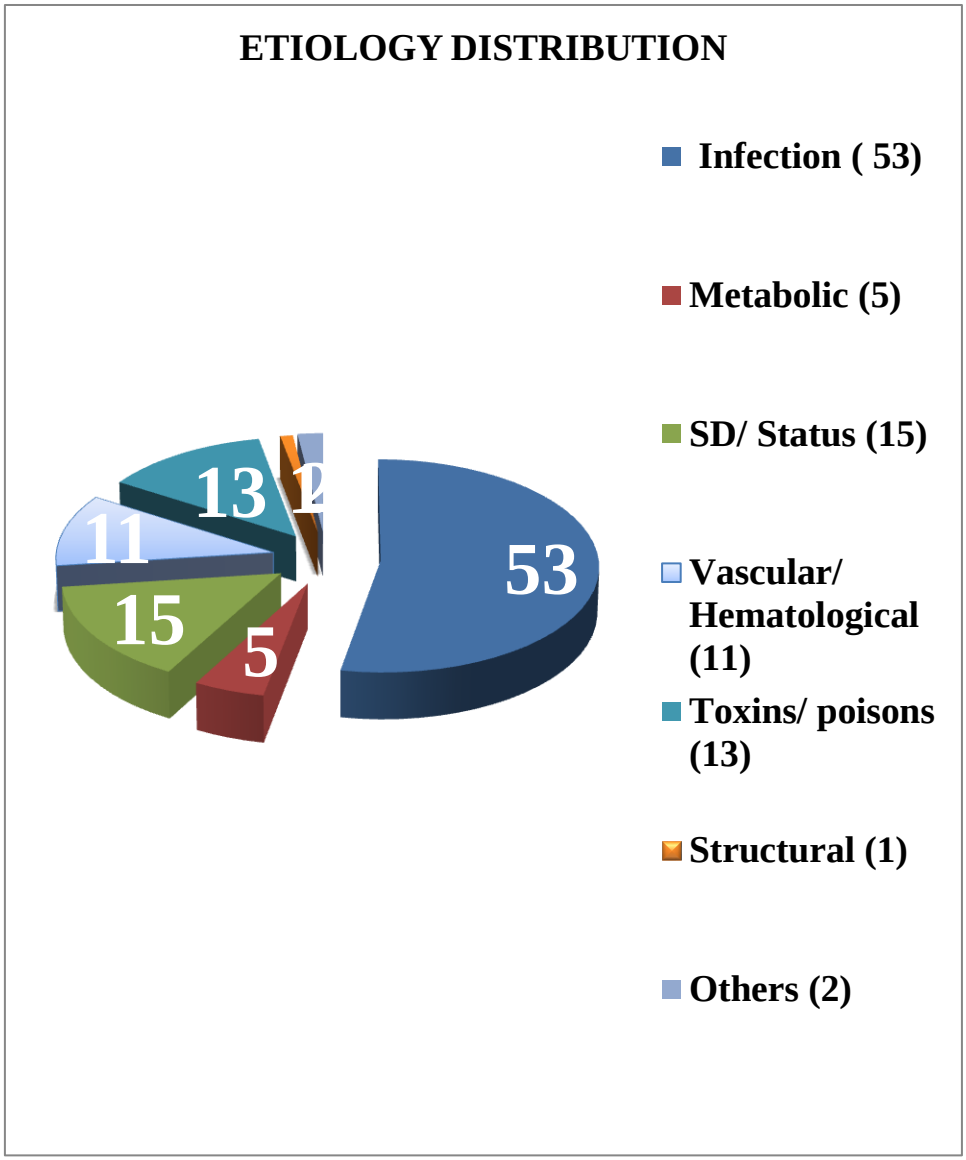
Sodium and potassium levels did not significantly correlated with outcome but the bicarbonate value showed significant association with mortality. 13% of children were acidotic, among them, 77% (10/13) expired. Acidosis had significant statistical correlation with mortality.

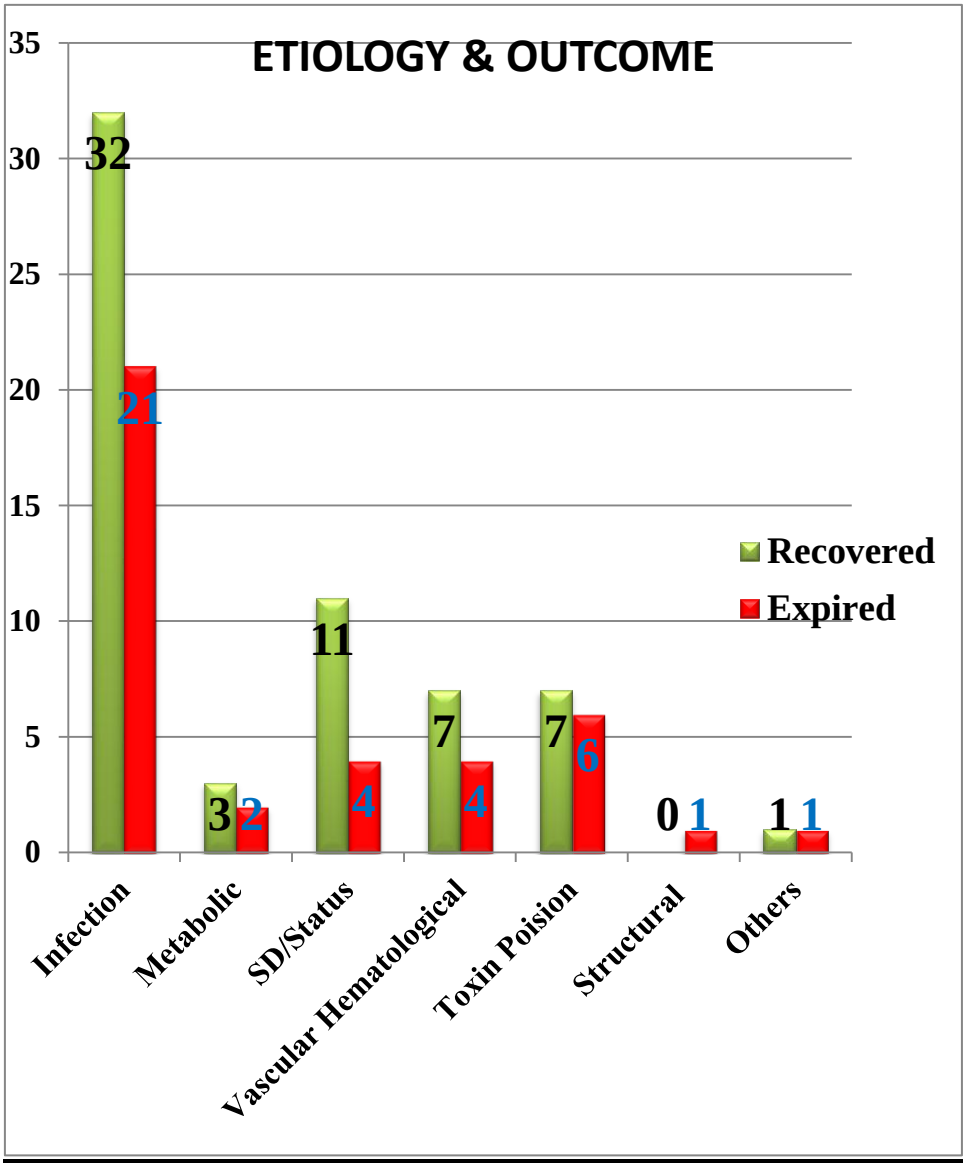
TABLE-20

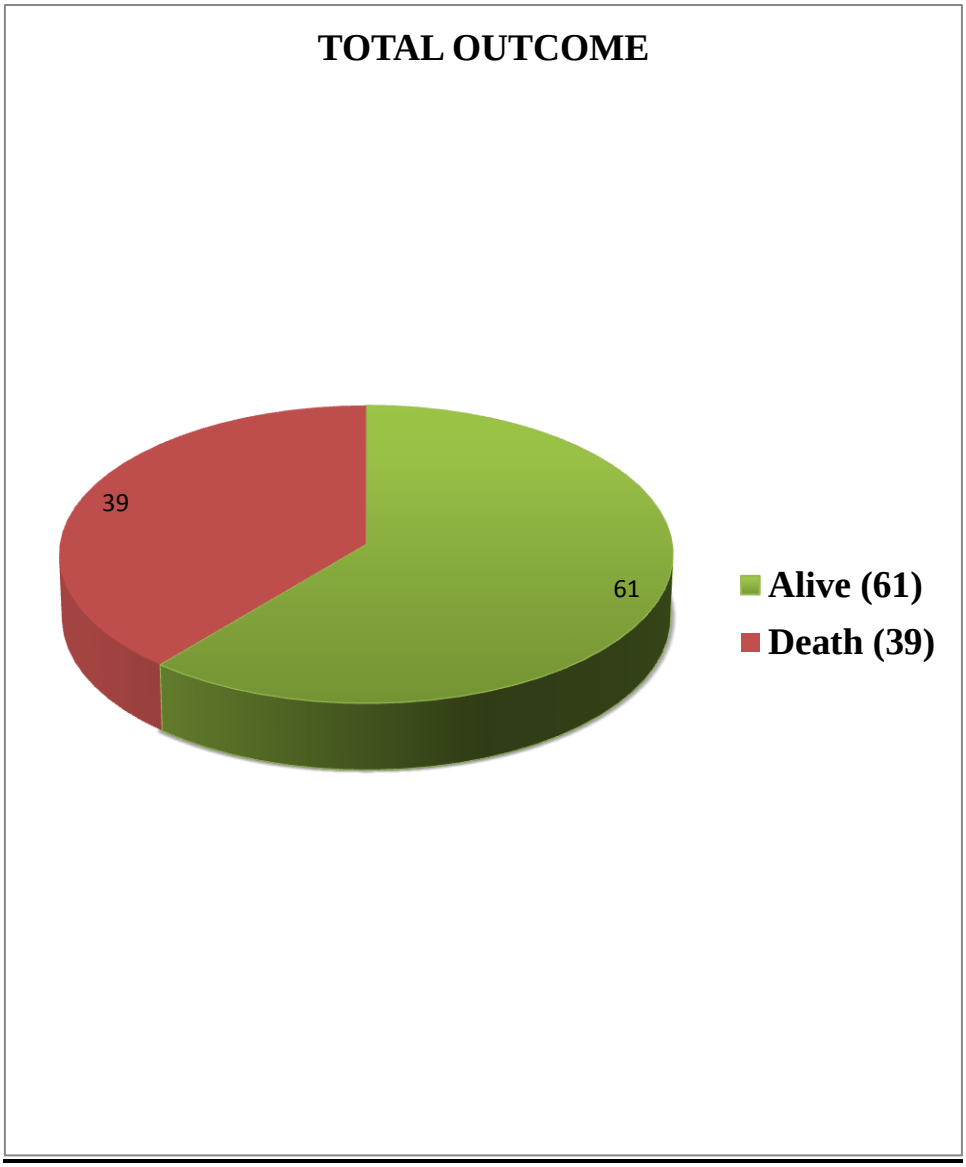
ETIOLOGY AND OUTCOME

Etiological group		Outcome			Total
		RwoD	RwD	Expired	
Infection	n (%)	16 (30.2%)	16 (30.2%)	21 (39.6%)	53 (100%)
Metabolic	n (%)	3 (60%)	0 (0%)	2 (40%)	5 (100%)
SD/Status	n (%)	10 (66.7%)	1 (6.7%)	4 (26.7%)	15 (100%)
Vas/Hemat	n (%)	6 (63.7%)	0 (0%)	4 (36.4%)	11 (100%)
Toxin/Poison	n (%)	7 (53.8%)	0 (0%)	6 (46.2%)	13 (100%)
Structural	n (%)	0 (0%)	0 (0%)	1 (100%)	1(100%)
Total	n (%)	43 (43.9%)	17 (17.3%)	38 (38.8%)	98 (100%)

Pearson Chi-Square P-value = 0.04 Significant


ETIOLOGY DISTRIBUTION
53
5
15
11
13
2
Infection (53)
Metabolic (5)
SD/ Status (15)
Vascular/ Hematological (11)
Toxins/ poisons (13)
Structural (1)
Others (2)


ETIOLOGY & OUTCOME
35
30
25
20
15
10
5
0
32
21
3
2
11
4
7
4
7
6
0
1
1
1
Recovered
Expired
Infection
Metabolic
SD/Status
Vascular Hematological
Toxin Poision
Structural
Others


TOTAL OUTCOME
39
61
Alive (61)
Death (39)

S. No	Diagnosis	No of cases	% of cases among the total	Outcome		
				RWOD	RWD	Expired
I	**Infection / Generalised sepsis**	**53**	**53%**			
	A) Pyogenic Meningitis	9	9%			
	1.Klebsiella	4	4%	1	1	2
	2.E.Coli	2	2%	1	-	1
	3.H.Influenza	1	1%	-	1	-
	4. Meningiococci	2	2%	-	1	1
	B) Probable Meningitis	10	10%	2	3	5
	C) Septic encephalopathy	16	16%	4	2	10
	C) TBM	10	10%	2	6	2
	D) Viral Meningo encephalitis	3	3%	1	2	-
	E) Dengue	3	3%	3	-	-
	F) Cerebral Malaria	2	2%	2	-	-
II	**Metabolic**	**5**	**5%**			
	A) Wilson's disease	1	1%	-	-	1
	B) DKA	3	3%	3	-	-
	C) IEM	1	1%	-	-	1
III	**Epilepsy/Seizure disorder**	**15**	**15%**	10	1	4
IV	**Vascular/ Hematological**	**11**	**11%**			
	A) HT Encephalopathy	5	5%	5	-	-
	B) VwD	1	1%	-	-	1
	C) MCA Infarct	1	1%	-	-	1
	D) Late HDN	1	1%	1	-	-
	E) Others	3	3%	1	-	2
V	**Toxins / Poisons**	**13**	**13%**			

	A) Snake bite envenomation	5	5%	3	-	2
	B) Scorpion sting	2	2%	2	-	-
	C) Camphor oil poisoning	1	1%	-	-	1
	D) Native medicine of unknown nature	2	2%	1	-	1
	E) Neem oil poisoning	3	3%	1	-	2
VII	**Structural**	**1**	**1%**	-	-	1
VIII	**Others**	**2**	**2%**			
	1) Near fatal asthma	1	1%	1	-	-
	2) Submersion injury	1	1%	-	-	1
	Total	**100**	**100%**	**44**	**17**	**39**

CNS Infection (53%) was the most common cause for non-traumatic coma in this study followed by seizure disorder with status epilepticus. In infective etiology 40% (21/53) mortality, which is statistically significant. But in case of epilepsy with status 2/3 of the patients recovered without neurological sequelae.

DISCUSSION

DISCUSSION

The prognosis of coma depends upon the etiology and other multiple predictors. Assessing the severity of coma is variable to one to one. Vaguely defined terms like delirium, stupor, coma, deep coma was inappropriate in explaining the real status and hence the outcome. So, there could be a difference between the different observers who carried out the examination [20]. Glasgow Coma Scale (GCS) exhibits the integrity of brain cortical functions. Extra ocular movements, pupillary responses and pattern of respiration regulated by the brain stem.

The GCS is a standardized system of assessment of neurological status developed initially for traumatic coma to assess the depthness of coma and to exhibit the severity of brain insult in respect to the final outcome [5]. It has achieved liberal use as it can be performed easily at the bedside and gives basic information on the status of coma children[21,22].

Literature on utility of GCS in children concerning to non traumatic coma is few only till date. This limitation should be overcome [23].

Another negative point of GCS score is three different parameters, which comes with the summation of each scores [5]. Loss of cumulative information may be happened.

In children with coma the range of insult of brain stem or cerebrum at the time of presentation, usually predicts the death and impairment. So, clinical assesment that exhibit range and depth of cerebral hemispheres involvement and/or brain stem dysfunction were analysed.

This study included 100 children in the age group of 2 month to 12 yrs.

40 were infants, 37 were between 1 to 5 yrs, 23 were between 6 to 12 yrs. Of the 100 children, 48 were males and 52 were females.

Incidence of coma was higher in females when compared to males. But this is in contrast to a study done by Seshia[18] et al, who found no difference of incidence between the gender.

ETIOLOGICAL PROFILE**:**

With regard to etiology, infections group accounts for about 53 cases which included pyogenic meningitis, probable meningitis, septic encephalopathy ,etc.

Pyogenic Meningitis in 9 children, of which Klebsiella (4), Coli (2), H.Influenza (1), Meningiococci (2). TBM in 10 children, Viral Meningo encephalitis in 3 (JE) children, Dengue encephalopathy in 3 children, Cerebral Malaria in 2 children.

Pyogenic meningitis defined in this study "Acute febrile encephalopathy associated with culture positive CSF analysis or presence of the 2 of the following findings in CSF polymorpho - nuclear cells or glucose <40mg/dl / more than half of the blood sugar taken at the time of lumbar puncture (LP) / Gram staining positivity.

Probable meningitis defined in this study "there was no conclusive evidence to meet the criteria of intracranial infection according to the standard reference, but some evidence of biochemical alterations in CSF like elevated protein with or without reduced sugar but with culture negativity"

Septic encephalopathy defined in this study “absolutely normal CSF but with evidence of infection like CRP positivity, NEC positivity and other evidences ”.

It was noted that generalized Central Nervous System infections were the most common cause of non-traumatic coma. This is also found by other studies [25].

Of the generalized sepsis, septic encephalopathy constituted the most common accounting for about 30.2% (16/53) cases. This is more or less similar to a study done by Awasthi S et el [13], where 42.2% had pyogenic meningitis out of 230 cases.

Among the non-infectious causes, seizure order with or without developmental delay, presented with status epilepticus in the form of breakthrough seizures/ withdrawl seizures topped in the list.

Vascular / hematological cause contributed 11 cases, in which Htpertension encephalopathy (5/11) was the commonest one. HT due to Acute Glomerulo Nephritis (4) or Co- arctation of Aorta (1) was encountered.

Etiology of toxic/poison encephalopathy included neem oil poisoning 3 children, in which 2 of them were died. Snake bite envenomation in 5 children. Scorpion sting in 2 children both of them

were completely recovered. Native medicine of unknown nature in 2 children and camphor oil poisoning in 1 child.

Neem oil encephalopathy is one of the important cause for toxic encephalopathy in Tamilnadu. In a study conducted in TN MGR medical university, during period between 2005 and 2007, 88 cases of neem oil encep halopathy among them 27 cases expired.

In a study done by Nayana P C Praba et el [16] in Role of Glascow coma scale in pediatric coma, among 218 cases of coma 8 were due to neem oil.

Metabolic causes (5 cases) included hepatic encephalopathy and diabetic ketoacidosis (DKA) with coma. Hepatic encephalopathy constituted 1 case, that case was expired in day 1 of admission.3 children were due to DKA, all of them recovered completely. 1 child was two month old child was diagnosed as organic acidemia (inborn error of metabolism-IEM) by tandom mass spectrometry (TMS), expired.

Similar type of study was done by Arun bansal at PGIMER [10], Chandigarh, india found the etiology of coma in sixty % cases was Central Nervous System causes (tuberculous CNS infection- 19,

encephalitis-18, bacterial pyogenic meningitis-16, others etiologies-7); other etiologies were toxic-metabolic conditions (19%), status epilepticus / seizure disorder/ febrile status(10%), intracranial hemorrhage (7%), and others were (4%).

SOFIAH A et el and HUSSAIN I. H. M. I et al [14] at MALAYSIA analysed the etiology of coma in the 116 cases, 80 cases (69%) were due to CNS infection, 15 cases (13%) due to toxic-metabolic causes, 6 cases (5%) to hypoxic ischaemic encephalopathy, 4 cases (3.5%) due to intracranial bleed, 9 cases (7.8%) were due to other etiologies and 2 cases (1.7%) the cause was undiagnosed.

CLINICAL PROFILE AND OUTCOME:

Totally the 100 cases studied, 61 were survived and overall mortality was 39%. Of the 61 cases, 17 children survived with some neurological sequelae. The sequelae seen were hemiparesis (5), rigidity and extrapyramidal involvement (2), hydrocephalus (6), speech disturbance (1), cortical blindness(2), behavioural problem (1) in short term follow up.

AGE AND GENDER:

40 were infants, 37 were between 1 to 5 yrs, 23 were between 6 to 12 yrs. Of the 100 children, 48 were males and 52 were females.

The mortality rate was higher in children <1 of years age group (50%) and there was no significant relation between the gender and outcome. The higher incidence and mortality in children <1 year age group is probably related to higher frequency of sepsis and neural immaturity.

The incidence and outcome of coma did not statistically correlated with gender.

Seshia and Seshiaet el also did not find any difference between the two genders. Previous studies [26] have found a higher deaths in male (42%) compared to female children (20%).

ETIOLOGY AND OUTCOME:

The mortality in infection was 40% (21/53). Major contribution of septic encephalopathy noted. Among them 63% (10/16) expired. Klebsiella meningitis had 50% (2/4) mortality. E.Coli had 50% (1/2) mortality. 3 cases of JE, 1 recovered completely but other 2 children with recovered. One with aphasia and the other with spinomotor disablity. 20% (2/10) of TBM children expired. Dengue encephalopathy (3 children), cerebral malaria (2 children) and H.Influenza (1 child) are recovered. 2 children with meningiococcal infection, one of which expired and the other recovered with disability.

In the toxins/ poisons encephalopathies (13 children), snake bite envenomation 39% (5/13) was the most common cause ,in which 40% (2/5) of them were expired. The next common was neem oil encephalopathy (3/11), of which 2/3 expired. The others were native medicine of unknown nature - 2 children (1 expired), scorpion sting of 2 children (both of them recovered completely) and camphor oil - 1 child and expired.

Among the five children with metabolic causes , 3 DKA children survived, one with wilson's with hepatic encephalopathy and one with IEM -expired. Most common in this group was DKA 60% (3/5) all of them were recovered. 1 child with IEM, which was expired.

In status epilepticus group among the 15 children, 4 were 27% (4/15) were expired. This catogery included febrile status, seizure disorder with breakthrough/ withdrawl seizures.

In the vascular/ hematological causes (11%) HT encephalopathy 46% (5/11) was the leading cause, of which all of them recovered. 1 child Right MCA infarct - expired, one with von wille brand's disease – expired, late HDN 1 child expired. Others were 1 child with near fatal asthma – recovered, another one presented with sub mersion injury, expired.

GCS:

GCS score of 3 (3%), 4 (9%) were associated 100% mortality. GCS score of 5 (11%) children had 82% (9/11) mortality. GCS score of 6 and 7 had better outcome. Low GCS score is showed association with mortality with statistical significance.

This is similar to a study conducted by Pushpa Chadurvedi et el and Manu kishore et el [23] on Modified Glasgow Coma Scale to estimate mortality in febrile comatose child, of that, the positive predictive value for mortality for those with lower scores (MGCS<5) was 88.8%..

PUPILLARY REFLEX:

Of the 100 children studied, pupillary reflexes were preserved in 62 patients and absent in 30 cases. The mortality rate for those with non-reactive pupils was 60% (18/30). However, it should be appreciated that about 40% (12/30) of children with absent pupilary reaction have survived in our study.

Pupillary reactions were excellent predictors of both survivability and final outcome. Non-reactive pupils at the time of presentation was the strong predictors of a poor outcome. Similar observation was found in a study by Arun Bansal et al [10].

In the another study by Seshia et al sixty eight % of children, presented with fixed, non-reactive and dilated pupils for >2 hr expired[18].

Ogunmekan also had similar findings in a large descriptive study [25].

BRAINSTEM REFLEXES:

Presence of DEM implies unaffected connections between 3rd, 4th, 6th cranial nerve nuclei and the MLF and vestibular signals to this area of the brainstem. Asymmetrical eye/ pupillary findings are usually indicates unilateral brainstem structures pathology, while complete absence of DEM indicates bilateral brainstem structures/ pathology.

In our study brainstem reflexes were preserved in only 28% of the cases (28/100). The mortality rate associated with absent brainstem reflexes was 40% (19/48).

Nayana P C Praba et el [16], found in their study-noted similar findings like the link between abnormal brain stem reflexes and fatal final outcome.

CONCLUSIONS

CONCLUSIONS

- The incidence of non traumatic coma is high in infants.
- The incidence of coma is high in females when compared to males.
- Younger age was found to have an association with poor outcome.
- Gender did not have an association with final outcome.
- GCS scores can be easily assessed and poor scores (<5) show association with increased mortality.
- Infection is the most common cause of non traumatic coma in children.
- Poor GCS, hypothermia, shock, apnea, abnormal papillary reaction, abnormal DEM, abnormal imaging, leucopenia, thrombocytopenia, hypoglycemia, acidosis were found to be associated with poor prognosis.
- Diabetic keto acidosis when treated appropriately has a best outcome.
- Absence of brain stem reflexes at admission ends with an adverse outcome.

- Children with normal imaging studies have come with better outcome.
- 17% had sequelae.
- Mortality rate in this study was 39% (39/100).

LIMITATIONS

- Certain conditions (IEM, Reye syndrome) could not be diagnosed correctly because of shorter duration of hospital stay/ extreme sickness at presentation.
- Head injury was not included in this study as they were managed in neurosurgical department at RGGGH.
- Toxicological studies in children presented with toxic encephalopathy could not be done due to practical issues.
- Radio imaging (CT, MRI) could not be done in all cases due to extreme sickness at presentation or financial constraints of the family.
- Certain etiologies could not be identified due to the limited investigation facilities.
- Follow up could not be done for longer duration to conclude about the long term outcome.

RECOMMENDATIONS

- Nursing staffs/ students and paramedical workers can be taught about MGCS, so that monitoring and the progress could be the easier one.
- Early diagnosis and intensive management of shock and respiratory depression may help to the survival of the child.
- A good clinical examination should be done at presentation to identify the predictors for poor outcome like hypothermia, shock, apnea, abnormal papillary reaction, abnormal DEM in order to intervene early.

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ANNEXURES

INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI -3

Telephone No : 044 25305301
Fax : 044 25363970

CERTIFICATE OF APPROVAL

To
Dr. Kannan. D
PG in MD Paediatrics
Madras Medical College, Chennai -3

Dear Dr. Kannan. D

The Institutional Ethics committee of Madras Medical College, reviewed and discussed your application for approval of the proposal entitled "Etiology and outcome of non-traumatic coma in children" No. 02012012.

The following members of Ethics Committee were present in the meeting held on 27.01.2012 conducted at Madras Medical College, Chennai -3.

1.	Prof. S.K. Rajan. MD	-- Chairperson
2	Prof. Pregna B. Dolia MD ViCe Principal, Madras Medical College, Chennai -3 (Director , Institute of Biochemistry, MMC, Ch-3)	-- Member Secretary
3.	Prof. B. Kalaiselvi. MD Prof of Pharmacology ,MMC, Ch-3	-- Member
4.	Prof. Shruti Kamal MS Prof of Surgery, Madras Medical College , Ch-3	-- Member
5.	Thiru. S. Govindsamy. BA BL	-- Lawyer

We approve the proposal to be conducted in its presented form.

Sd/ Chairman & Other Members

The Institutional Ethics Committee expects to be informed about the progress of the study, and SAE occurring in the course of the study, any changes in the protocol and patients information / informed consent and asks to be provided a copy of the final report.

Member Secretary, Ethics Committee

PROFORMA

- **NAME:**
- **AGE:** **SEX:**
- **IP NO:**
- **DURATION OF PICU STAY:**

History	present	absent	duration
Trauma			
Fever			
ALOC			
Seizures			
Headache			
Vomiting			
Skin leisons			
Contact with TB			
Toxin/poison exposure			
Seizure disorder			
Chronic drug intake			
Developmental delay			
On anti-convulsants			

GENERAL PHYSICAL EXAMINATION; -------

Vital signs:

- **Temperature**: normal/hyper/hypothermia. ( )
- **Pulse**: normal/tachy/bradycardia.( )
- **Respiration**:normal/tachy/bradypnea/apnea. ( )
- **BP** : normal/hyper/hypotension/unrecordable.( )

- **Anemia/cyanosis/clubbing/jaundice/edema/ eschar /lymphadenopathy**
- **Neurocutaneous markers** :-present /absent
- **Skin &joints:** ---bleeding evidences:-present /absent,
- **Head**: Any evidence of injury :-present /absent
- **AF** --open / closed
- If open:- flat/tense/bulging.
- **Anthropometry:- Weight-** Normal/low/high
- **HC:** normal/micro/macro cephaly.

EXAMINATION OF CENTRAL NERVOUS SYSTEM;

- **GCS score** (eye opening, motor ,verbal)-- /15,
- **Fundus examination :**
- **papilloedema:-**present /absent**,**
- **Evidence of bleeding:-**present /absent..
- **Signs of meningeal irritation:** present/absent
- If present;--Neck rigitidy /Kernig sign/ Brudzinsky sign
- **PUPILS:** reactive/sluggishly reacting/non-reactive/unequal.,
- **DEM**: present/ defective/absent.
- **FOCAL DEFICIT**: present/absent
- **TONE:** normal/hyper/hypo tonia.,
- **REFLEX:**normal/hyper/hypo reflexia,
- **CEREBRAL EDEMA:** present/absent,

BLOOD:- please mention the value is abnormal.

- **TC-** low/normal/high.( )
- **DC**-normal/abnormal. ( )
- **PLATELET-** low/normal/high. ( )
- **Peripheral smear**- normal/abnormal( )

- **ESR**-normal/high/low. ( )
- **Sugar**- normal/high/low.( )
- **Electrolytes**-normal/abnormal.( )
- **Na-** normal/high/low( )
- **K-** normal/high/low( )
- **HCO3-** normal/high/low( )
- **Urea**- normal/high( )
- **Creatinine**- normal/high( )
- **Calcium-** normal/high/low. ( )
- **c/s (NEC)-** growth/no growth. ( )
- **LFT-** normal/elevated.
- **PT-** normal/high( )
- **aPTT-** normal/high( )
- **Lactate-** normal/high( )
- **Pyruvate-** normal/high( )
- **Ammonia-** normal/high( )
- **Viral studies:** negative/ positive for HSV/JE/Coxsackie
- **PCR:** negative/ positive for HSV/JE/Coxsackie
- **Mx-** positive/negative

URINE:-

- **Albumin-**absent/present. ( )
- **Sugar**- absent/present. ( )
- **Ketone bodies**- absent/present.
- **c/s:** growth/no growth ( )

CSF ANALYSIS:

- **Cells**- absent/present. ( )

- **Sugar-** normal/high/low.( )
- **Protein**- normal/high/low ( )
- **c/s-** Growth/no growth. ( )
- **Gram's stain**-positive/negative.
- **AFB-** positive/negative.
- **Viral studies:** negative/ positive for HSV/JE/Coxsackie
- **PCR:** negative/ positive for HSV/JE/Coxsackie

ABG:-

- **Ph**-normal/acidosis/alkalosis. ( )
- **Po2**- normal/high/low. ( )
- **Pco2**- normal/high/low. ( )
- **X-Ray**: Chest-

  skull- fracture/ no fracture.
- **USG cranium:**
- **EEG:**seizures/no seizures.
- **CT SCAN:**
- **MRI:**
- **OTHERS:**
- **FINAL DIAGNOSIS:**
- INFECTION, SEPSIS, METABOLIC, EPILEPSY/ SEIZURE DISORDER, VASCULAR/HEMATOLOGICAL, TOXINS / POISONS, STUCTURAL, OTHERS.
- **OUTCOME:**
- Recovered without disability/
  Recovered with disability/ expired

ABBREVIATIONS

AFB	-	Acid fast bacilli.
ADEM	-	Acute disseminated encephalomyelitis.
AGN	-	Acute Glomerulo Nephritis.
CoA	-	Co Arctation of aorta.
CNS	-	Central Nervous system
CT	-	Computed Tomography.
DEM	-	Dolls eye movement.
ESR	-	Erythrocyte sedimentation rate.
GCS	-	Glasgow Coma Scale.
ICT	-	Intra cranial tension.
PPRF	-	Para Pontine Reticular Formation.
IP	-	In patient.
MRA	-	Magnetic Resonance Angiography
MLF	-	Medial Longitudinal Fasciculus.
MRI	-	Magnetic Resonance Imaging.
CRP	-	C Reactive Protein.
ABG	-	Arterial blood gas analysis.
PCR	-	Polymerase chain reaction.
Po2	-	Partial pressure of oxygen.

PCo2	-	Partial pressure of carbon di oxide
OPC	-	Organo Phosphorus Compounds
TC	-	Total count
DC	-	Differential count
NEC	-	Non enteric culture
PT	-	Prothrombin time
HCO3	-	Bi corbonate
Na	-	Sodium
K	-	Potassium
C/S	-	Culture and Sensitivity
APT	-	Activated partial prothrombin time
USG	-	Ultra sono gram.

Parameters	Data Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
age_m_d	enter actual days or months of baby as number	36	3	2	60	12	3	132	15	5	2	36	15	9	60	33	60	5	11	60	9	30	11	5	36	5
sex	enter male as 1 female as 2	2	1	1	2	1	1	2	1	1	2	2	2	2	1	1	2	2	1	1	2	1	2	2	1	2
dur_ps	enter actual duration of hours if hrs only					9			23		3															
dur_ps1	enter actual duration of day if day	4	5	6	11		10	3		22		43	3	18	1	12	5	16	12	7	6	4	3	4	2	10
ho_Trama	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
ho_Tra_dur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d																									
ho_Fever	enter present as 1 absent as 2	1	2	1	2	1	1	2	1	1	1	1	2	1	2	1	2	1	1	2	1	2	2	2	2	1
ho_Fev_dur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d	1d		2d		3d	4d		2d	7d	1d	14d		3d		2d		3d	15d		3d					4d
ho_ALOC	enter present as 1 absent as 2	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ho_AL_dur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d	1d	3d	1d	1d	2d	2d	6h	6h			1d	1d	3d	1h	1d	6h	2d	1d	1d	2h	3h	1h	6h	1h	2h
ho_sei	enter present as 1 absent as 2	1	1	2	1	2	1	2	1	1	2	1	1	1	2	1	2	1	1	1	2	1	2	1	2	1
ho_sei_dur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d	1d	2d		1d		1d		1h	3h		2d	3h	3d		5h		1d	1d	6h		2h		6h		2h
ho_hdache	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2	2	2	2	2	2
ho_hddur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d																6h			1d						
ho_vomit	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	1	1	2	1	2	2	2	2	2	1	2
ho_vo_dur	enter actual number with h as hour and d as d For ex 5 hours as 5 h, 3 day as 3d											6h	2d			1d	4h		2h						1h	
ho_skleison	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2
ho_skldur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d																6h									
ho_TB	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2	2	2	2	2	2	2
ho_poiexp	enter present as 1 absent as 2	2	2	1	2	2	2	1	2	2	2	2	2	2	1	2	1	2	2	2	2	2	2	2	2	2
ho_sei_dis	enter present as 1 absent as 2	1	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2
ho_ch_drug	enter present as 1 absent as 2	1	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2
ho_devel_delay	enter present as 1 absent as 2	1	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2
ho_anti_con	enter present as 1 absent as 2	1	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2
temp	enter normal as 1 hyper as 2 hypothermia as 3	1	1	1	2	2	1	1	2	1	1	1	3	1	1	2	1	3	1	1	2	1	1	1	1	1
pulse	enter normal as 1 tachy as 2 bradycardia as 3	1	1	2	2	2	1	2	2	1	2	2	1	1	1	2	1	2	1	1	1	1	2	1	1	2
resp	enter normal as 1 tachy as 2 brady as 3 apnea as 4	1	1	1	4	2	1	3	4	1	4	4	2	1	2	2	1	2	1	1	1	1	3	1	4	4
Bp	enter normal as 1 hyper as 2 hypo as 3 unrecordable as 4	1	1	1	2	2	1	1	3	1	3	1	1	1	1	1	1	3	1	1	1	1	3	1	1	3
oth_sign	presence of anemia as 1 cyanosis as 2 clubbing as 3 jaundice as 4 edema as 5 eschar as 6 lmph. as 7		1	1		1					1		1			1		1	1		1					
neu_mark	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2

sk_jt_bld	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
head_inj	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
AF	enter open as 1 closed as 2	2	1	1	2	2	1	2	2	1	1	2	2	1	2	2	2	1	1	2	1	2	1	1	2	1	
AF_yes	enter flat as 1 tense as 2 bulging as 3		1	1			2			3	3			1				3	2		2		1	1		2	
anthro_wt	enter normal as 1 low as 2 high as 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1
HC	enter normal as 1 micro as 2 macrocephaly as 3	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1
GCS_scr	enter actual score	6	6	7	7	7	7	7	3	5	3	5	7	7	7	7	6	7	6	7	7	7	5	7	6	6	7
FE_pap	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2
FE_evi_bld	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	
Sign_men_irr	enter present as 1 absent as 2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	
men_irr_site	enter neck regidity as 1 kernig as 2 brudzinsky as 3						1											1	1								
pupils	reactive as 1 non reactive as 2, sluggishly reacting as 3	1	1	1	2	1	1	3	1	2	2	1	1	1	3	1	1	1	1	1	2	1	1	2	2	3	
dem	enter present as 1 absent as 2 defective as 3	3	2	2	2	3	3	1	3	3	2	3	3	1	1	3	1	2	2	1	2	2	1	2	2	2	
tone	enter normal as 1 hyper as 2 hypo tonia as 3	3	3	3	3	3	3	3	3	2	3	3	3	2	1	2	3	3	3	1	1	2	1	3	3	3	
reflex	enter normal as 1 hyper as 2 hyper reflexia as 3	3	2	3	3	1	2	3	3	2	3	3	3	2	1	1	1	3	2	1	1	2	1	3	1	1	
cer_edema	enter present as 1 absent as 2	2	1	2	2	2	1	2	1	2	1	1	2	1	2	1	2	1	1	2	2	1	2	2	2	1	
TC	low as 1 normal as 2 high as 3	2	2	2	3	1	3	2	1	2	2	2	2	3	3	3	3	3	2	2	3	2	2	2	2	3	
DC	normal as 1 abnormal as 2	1	1	1	2	1	2	2	1	2	1	1	2	1	2	1	1	2	1	1	2	1	2	2	1	1	
Platlet	low as 1 normal as 2 high as 3	2	2	2	2	2	2	2	1	2	1	2	1	1	2	1	2	2	2	2	1	2	2	2	2	2	
per_smear	normal as 1 abnormal as 2	1	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	
sug	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	3	1	1	1	1	1	2	3	1	1	1	1	1	1	1	1	1	1	
elect	normal as 1 abnormal as 2	1	1	1	1	1	1	2	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	
Na	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	
K	normal as 1 high as 2 low as 3	1	1	1	1	1	1	3	3	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	
HCO3	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
urea	normal as 1, high as 1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
creat	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
cal	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
cs_NEC	growth as 1 no growth as 2	2	2	2	2	2	2	2	1	2	2	1	2	2	2	2	2	1	2	2	1	2	2	2	2	2	
LFT	normal as 1 elavated as 2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	2	1	
PT	enter normal as 1 high as 2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
aPTT	enter normal as 1 high as 2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	
Lactate	enter normal as 1 high as 2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	2	1	2	1	1	1	
Pyruvat	enter normal as 1 high as 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	
Ammonia	enter normal as 1 high as 2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Viral_stu	enter negative as 1 positive as 2 as JE as 3 Coxsckie as 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	
PCR	enter negative as 1 positive as 2 as JE as 3 Coxsckie as 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Mx	poasitive as 1 negative as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	
ur_alb	enter absent as1 present as 2	1	2	2	1	1	2	1	2	1	1	1	1	2	1	1	1	2	2	1	2	1	1	1	1	1	
ur_sug	enter absent as1 present as 2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	2	

ur_ket	enter absent as1 present as 2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1	1	1	1	1
cs	growth as 1 no growth as 2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2
CSF_cells	enter present as 1 absent as 2	2	2	1	2	2	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2
CSF_sug	normal as 1 high as 2 low as 3	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	3	3	1	1	1	1	1	1	1
CSF_pro	normal as 1 high as 2 low as 3	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	1	2	2	1	1	1	1	1	1	1
CSF_cs	growth as 1 no growth as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
CSF_Gr_st	poasitive as 1 negative as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2
CSF_AFB	poasitive as 1 negative as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2
CSF_Vir_st	enter negative as 1 positive as 2 as JE as 3 Coxsckie as 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CSF_PCR	enter negative as 1 positive as 2 as JE as 3 Coxsckie as 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ABG_ph	normal as 1 acidosis as 2 alkalosis as 3	1	1	1	1	2	1	3	2	1	1	1	1	2	1	1	2	2	1	2	2	1	2	2	3	2
ABG_po2	normal as 1 high as 2 low as 3	1	1	1	1	3	1	3	2	1	1	1	1	3	1	1	1	3	1	1	3	1	3	3	3	1
ABG_pco2	normal as 1 high as 2 low as 3	1	1	1	1	2	1	3	3	1	1	1	1	3	1	1	2	2	1	2	2	1	2	2	3	3
Xray_che	normal as 1 abnormal as 2	1	2	2	2	2	1	1	2	2	1	2	2	1	1	2	1	1	2	1	2	1	2	1	1	1
Xray_skull	fracture as 1 no fracture as 2																									
EEG	seizures as 1 no seizures as 2				1																2					
USG cranium	normal as 1 , abnormal as 2							1										2	2		2			2		
CT_scan	normal as 1 abnormal as 2		2		2		2			2		2	2			2	1	2	2	2		1	1	2	1	1
MRI	normal as 1 abnormal as 2																									1
Others	normal as 1 abnormal as 2																									
Fin_diag	infection as 1 metabolic as 2 epilepsy/sd as 3 vas/hemat as 4 tox/poi as 5 strutural as 6 others as 7	3	6	5	3	1	1	5	1	4	4	1	4	1	5	1	5	1	1	4	1	3	7	4	4	1
outcome	recovered without disability as 1 recovered with disability as 2 expired as 3	3	3	3	3	3	1	1	3	3	3	3	3	1	1	2	1	2	2	1	3	1	1	1	1	2

Parameters	Data Variables	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
age_m_d	enter actual days or months of baby as number	9	36	3	6	132	42	6	8	3	108	60	96	9	8	12	84	108	132	84	72	48	24	24	14	84
sex	enter male as 1 female as 2	2	2	1	1	2	2	2	2	2	1	1	2	2	1	1	2	1	1	1	1	2	2	1	2	1
dur_ps	enter actual duration of hours if hrs only					15	6																		20	
dur_ps1	enter actual duration of day if day	19	24	17	18			2	6	2	6	17	4	14	3	12	1	3	10	5	20	2	3	20		4
ho_Trama	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2		2	2	2	2	2	2	2	2	2	2	2
ho_Tra_dur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d																									
ho_Fever	enter present as 1 absent as 2	1	1	1	1	2	1	1	1	2	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	2
ho_Fev_dur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d	3d	10d	3d	1d		2d	1d	2d		7	5d	7d	5d	8d	10d								14d	2d	
ho_ALOC	enter present as 1 absent as 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1
ho_AL_dur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d	1d	2d	6h	2h	1d	6h	2h	2h	4h	1h	1d	1d	1d	3d		2d	6h	2d	1d	12h	1h	6h	1d	6h	6h
ho_sei	enter present as 1 absent as 2	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	2	2	2	2	2	2	1	1	1	2
ho_sei_dur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d	12h	1d	2h	2h	1d	3h	2h	1h	4h	1h	3h		1d		1d							2h	2d	1h	
ho_hdache	enter present as 1 absent as 2	2	1	2	2	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2
ho_hddur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d		1d			1d											2h	6h	20d	1d						
ho_vomit	enter present as 1 absent as 2	1	1	2	2	1	1	2	1	1	2	2	1	1	2	1	2	1	1	1	2	2	1	1	2	2
ho_vo_dur	enter actual number with h as hour and d as d For ex 5 hours as 5 h, 3 day as 3d	12h	6h			1d	1d		2d	1h			1d	12h		6h		2h	20d	6h			2d	6h		
ho_skleison	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
ho_skldur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d																									
ho_TB	enter present as 1 absent as 2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	1	1	2	2	2	2	2	2	2
ho_poiexp	enter present as 1 absent as 2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	1
ho_sei_dis	enter present as 1 absent as 2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
ho_ch_drug	enter present as 1 absent as 2	2	2	2	2	1	2	2	2	1	1	2	2	2	2	2	1	2	2	1	2	2	2	2	2	2
ho_devel_delay	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
ho_anti_con	enter present as 1 absent as 2	2	2	2	2	1	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
temp	enter normal as 1 hyper as 2 hypothermia as 3	2	1	2	1	2	1	1	2	1	2	2	2	1	2	2	1	1	1	1	1	1	3	1	2	1
pulse	enter normal as 1 tachy as 2 bradycardia as 3	2	2	2	1	2	2	2	2	1	2	2	2	1	2	2	1	2	1	1	2	1	1	2	2	2
resp	enter normal as 1 tachy as 2 brady as 3 apnea as 4	4	2	2	1	2	2	1	4	1	2	2	2	2	2	2	1	2	1	2	2	2	2	4	4	3
Bp	enter normal as 1 hyper as 2 hypo as 3 unrecordable as 4	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	3	2	2	3	1	1	1	3	1
oth_sign	presence of anemia as 1 cyanosis as 2 clubbing as 3 jaundice as 4 edema as 5 eschar as 6 lmph. as 7	1	1		1	1						1		1	1	7	4		1	1			1			
neu_mark	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
sk_jt_bld	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

head_inj	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
AF	enter open as 1 closed as 2	1	2	1	1	2	2	1	1	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2
AF_yes	enter flat as 1 tense as 2 bulging as 3	2		2	2			1	1					2	2												
anthro_wt	enter normal as 1 low as 2 high as 3	1	1	1	1	1	1	1	1	1	2	1	2	2	1	2	1	1	2	2	1	1	1	1	1	1	1
HC	enter normal as 1 micro as 2 macrocephaly as 3	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
GCS_scr	enter actual score	4	7	6	7	7	5	7	7	6	7	6	7	6	7	6	4	6	6	6	4	7	7	5	3	7	
FE_pap	enter present as 1 absent as 2	2	1	2	2	2	2	2	2	2	2	2	2	1	2	1	2	2	1	2	2	2	2	2	2	2	2
FE_evi_bld	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Sign_men_irr	enter present as 1 absent as 2	2	1	2	2	2	1	2	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2
men_irr_site	enter neck regidity as 1 kernig as 2 brudzinsky as 3		2				1							1	1	1											
pupils	reactive as 1 non reactive as 2, sluggishly reacting as 3	2	1	1	1	2	1	1	1	1	1	2	1	2	1	2	2	1	1	1	2	3	1	1	1	3	
dem	enter present as 1 absent as 2 defective as 3	2	2	1	1	2	2	2	1	2	2	2	1	2	2	2	3	1	1	1	3	1	3	3	3	1	
tone	enter normal as 1 hyper as 2 hypo tonia as 3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	3	3	1	3	3	3	3	
reflex	enter normal as 1 hyper as 2 hyper reflexia as 3	1	3	3	3	3	3	2	3	3	2	1	1	3	1	1	3	1	1	1	3	1	3	3	3	3	
cer_edema	enter present as 1 absent as 2	1	1	1	1	1	1	1	2	2	2	1	2	2	2	1	2	1	2	2	1	2	2	1	1	2	
TC	low as 1 normal as 2 high as 3	2	2	3	2	2	3	2	3	1	2	2	2	3	2	3	2	3	2	2	2	3	2	2	1	2	
DC	normal as 1 abnormal as 2	1	1	2	1	1	2	1	1	2	1	2	2	2	2	2	1	1	1	1	1	2	2	1	1	2	
Platlet	low as 1 normal as 2 high as 3	1	1	1	2	2	1	2	1	1	2	2	1	2	1	2	2	2	2	2	2	2	1	2	1	2	
per_smear	normal as 1 abnormal as 2	2	1	2	2	1	2	1	1	1	1	1	1	1	2	1	1	2	1	2	1	1	1	1	1	1	
sug	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	3	1	
elect	normal as 1 abnormal as 2	2	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	2	1	2	2	2	1	1	2	2	
Na	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	3	3	1	1	1	2	1	
K	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	3	1	2	1	1	1	1	1	1	1	1	2	1	3	1	1	3	3	
HCO3	normal as 1 high as 2 low as 3	3	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	3	1	3	3	1	1	1	3	1	
urea	normal as 1, high as 1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	2	1	
creat	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	
cal	normal as 1 high as 2 low as 3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	3	1	
cs_NEC	growth as 1 no growth as 2	1	2	2	2	2	2	2	2	1	2	2	2	1	2	2	2	2	2	2	2	2	2	2	1	2	
LFT	normal as 1 elavated as 2	2	1	1	1	1	1	1	2	2	1	2	1	1	2	1	2	2	1	1	1	1	1	1	2	1	
PT	enter normal as 1 high as 2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	
aPTT	enter normal as 1 high as 2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	
Lactate	enter normal as 1 high as 2	2	1	1	1	1	1	1	2	2	1	1	1	1	1	1	2	1	1	2	2	1	1	1	2	1	
Pyruvat	enter normal as 1 high as 2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Ammonia	enter normal as 1 high as 2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Viral_stu	enter negative as 1 positive as 2 as JE as 3 Coxsckie as 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	1	1	
PCR	enter negative as 1 positive as 2 as JE as 3 Coxsckie as 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	1	1	
Mx	poasitive as 1 negative as 2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	1	2	2	
ur_alb	enter absent as1 present as 2	2	1	1	1	2	1	1	2	1	1	2	1	2	2	1	1	1	2	2	1	1	1	1	2	1	
ur_sug	enter absent as1 present as 2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1	1	1	1	1	
ur_ket	enter absent as1 present as 2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1	1	1	1	1	
cs	growth as 1 no growth as 2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	1	2	2	2	2	2	1	2	2	2	

CSF_cells	enter present as 1 absent as 2	2	2	2	1	2	2	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1
CSF_sug	normal as 1 high as 2 low as 3	1	3	3	1	3	1	1	1	2	1	1	1	3	1	3	1	2	1	1	1	1	1	1	1	1	1
CSF_pro	normal as 1 high as 2 low as 3	1	1	2	1	2	2	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1
CSF_cs	growth as 1 no growth as 2	2	2	1	2	2	2	2	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	2	2
CSF_Gr_st	poasitive as 1 negative as 2	2	2	2	2	2	1	2	2	2	2	2	2	1	2	1	2	2	2	2	2	2	2	2	1	2	2
CSF_AFB	poasitive as 1 negative as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2
CSF_Vir_st	enter negative as 1 positive as 2 as JE as 3 Coxsckie as 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CSF_PCR	enter negative as 1 positive as 2 as JE as 3 Coxsckie as 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ABG_ph	normal as 1 acidosis as 2 alkalosis as 3	2	2	2	1	1	2	1	3	3	1	3	1	2	1	1	1	2	1	1	2	1	1	1	2	3	3
ABG_po2	normal as 1 high as 2 low as 3	3	3	3	1	1	3	1	3	3	1	3	3	3	1	1	1	1	1	1	3	1	1	1	2	3	3
ABG_pco2	normal as 1 high as 2 low as 3	3	3	3	1	1	3	1	3	3	1	3	3	2	1	1	1	3	1	3	3	1	1	1	3	3	3
Xray_che	normal as 1 abnormal as 2	2	1	2	2	1	1	1	2	1	1	1	2	1	2	2	1	1		1	1	1	2	2	2	1	1
Xray_skull	fracture as 1 no fracture as 2																										
EEG	seizures as 1 no seizures as 2																										
USG cranium	normal as 1 , abnormal as 2			2	2			2		1				1													1
CT_scan	normal as 1 abnormal as 2	2	2			2		2	2	2		2		1		2			2				2	2			
MRI	normal as 1 abnormal as 2	2								2		2															
Others	normal as 1 abnormal as 2																										
Fin_diag	infection as 1 metabolic as 2 epilepsy/sd as 3 vas/hemat as 4 tox/poi as 5 strutural as 6 others as 7	1	1	1	1	1	1	5	1	1	3	4	1	1	1	1	2	1	4	2	7	5	4	1	1	5
outcome	recovered without disability as 1 recovered with disability as 2 expired as 3	3	2	1	2	3	3	3	3	3	1	1	1	2	1	2	3	1	1	1	3	1	3	3	3	1

Parameters	Data Variables	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
age_m_d	enter actual days or months of baby as number	4	84	3	48	7	18	48	24	72	90	8	3	7	48	14	120	5	84	5	72	84	24	132	2	108
sex	enter male as 1 female as 2	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	2	2	2	1	1	1	1	2	2	2
dur_ps	enter actual duration of hours if hrs only																								8	
dur_ps1	enter actual duration of day if day	8	10	5	5	7d	13	13	15	3	4	12	1	10	18	1	6	7	7	4	4	3	17	4		3
ho_Trama	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
ho_Tra_dur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d																									
ho_Fever	enter present as 1 absent as 2	1	2	1	1	1	1	1	1	2	2	1	1	1	1	1	2	1	2	1	1	1	1	2	1	1
ho_Fev_dur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d	4d		2d	1d	10d	10d	11d	25d			3d	2d	7d	14d	2d		4d		2d	3d	6h	*30d*		3d	2d
ho_ALOC	enter present as 1 absent as 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ho_AL_dur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d	2d	1d	1d	1d	2d	1d	2d	12h	2h	3h	6h	6h	2d	1d	6h	4h	2d	1d	1d	1d	2h	2h	2h	1d	8h
ho_sei	enter present as 1 absent as 2	1	1	2	1	1	1	2	2	1	1	1	1	1	1	1	2	1	1	2	1	2	1	1	1	2
ho_sei_dur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d	1d	1d		1d	2h	1h			2h	3h	6h	2h	6h	2d	1h		1d	1d		6h		1h	2h	18h	
ho_hdache	enter present as 1 absent as 2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2
ho_hddur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d							1d															10d			
ho_vomit	enter present as 1 absent as 2	2	2	2	2	1	1	1	1	2	2	1	2	1	1	2	2	2	2	2	2	2	1	2	2	2
ho_vo_dur	enter actual number with h as hour and d as d For ex 5 hours as 5 h, 3 day as 3d					1d	1d	1d	6h			6h		1d	12h								5d			
ho_skleison	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
ho_skldur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d																									
ho_TB	enter present as 1 absent as 2	2	2	2	2	1	2	2	1	2	2	1	2	2	2	2	2	2	2	2	2	2	1	2	1	2
ho_poiexp	enter present as 1 absent as 2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2	2	2	2	2	2
ho_sei_dis	enter present as 1 absent as 2	2	1	2	1	2	2	2	1	1	1	2	2	2	2	2	2	2	1	2	1	2	2	1	2	2
ho_ch_drug	enter present as 1 absent as 2	2	1	2	1	2	2	2	1	1	1	2	2	2	2	2	2	2	1	2	1	2	2	1	2	1
ho_devel_delay	enter present as 1 absent as 2	2	1	2	1	2	2	2	2	2	1	2	2	2	2	2	2	2	1	2	1	2	2	1	2	2
ho_anti_con	enter present as 1 absent as 2	2	1	2	1	2	2	2	1	1	1	2	2	2	2	2	2	2	1	2	1	2	2	1	2	2
temp	enter normal as 1 hyper as 2 hypothermia as 3	1	2	1	1	1	1	2	1	1	1	2	2	2	1	2	1	1	2	1	1	2	1	1	3	2
pulse	enter normal as 1 tachy as 2 bradycardia as 3	1	2	2	1	2	1	2	1	1	1	2	2	2	2	2	2	1	2	2	1	2	1	2	2	2

resp	enter normal as 1 tachy as 2 brady as 3 apnea as 4	1	4	1	1	2	1	2	1	1	1	2	2	2	4	4	3	1	4	1	1	2	2	2	2	2	
Bp	enter normal as 1 hyper as 2 hypo as 3 unrecordable as 4	1	2	1	1	1	1	1	1	1	1	3	3	1	1	3	1	1	2	1	1	3	1	1	4	1	
oth_sign	presence of anemia as 1 cyanosis as 2 clubbing as 3 jaundice as 4 edema as 5 eschar as 6 lmph. as 7			1		1		1	1	1	1	1	1	1						1			1		1		
neu_mark	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
sk_jt_bld	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
head_inj	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
AF	enter open as 1 closed as 2	1	2	1	2	1	2	2	2	2	2	1	1	1	2	2	2	1	2	1	2	2	2	2	1	2	
AF_yes	enter flat as 1 tense as 2 bulging as 3	2		1		3						3	3	2				2		2					3		
anthro_wt	enter normal as 1 low as 2 high as 3	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	
HC	enter normal as 1 micro as 2 macrocephaly as 3	1	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	
GCS_scr	enter actual score	7	7	7	6	5	7	6	7	7	7	6	4	7	6	4	6	7	7	6	7	6	7	6	4	7	
FE_pap	enter present as 1 absent as 2	2	2	2	2	1	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
FE_evi_bld	enter present as 1 absent as 2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Sign_men_irr	enter present as 1 absent as 2	1	2	2	2	1	2	2	2	2	2	1	2	2	2	2	2	1	2	2	2	2	1	2	1	2	
men_irr_site	enter neck regidity as 1 kernig as 2 brudzinsky as 3	1				1						1						1					1		1		
pupils	reactive as 1 non reactive as 2, sluggishly reacting as 3	1	2	1	1	2	2	1	1	1	1	2	2	1	1	1	3	1	2	1	1	1	1	1	2	1	
dem	enter present as 1 absent as 2 defective as 3	3	2	2	3	2	1	2	2	1	1	2	2	2	3	3	1	3	2	2	3	1	2	2	3	1	
tone	enter normal as 1 hyper as 2 hypo tonia as 3	3	3	3	3	3	3	3	3	1	1	3	3	3	3	3	3	3	3	3	3	1	3	3	3	1	
reflex	enter normal as 1 hyper as 2 hyper reflexia as 3	2	3	3	3	3	3	1	3	1	1	3	3	1	3	3	3	2	3	1	1	1	1	1	3	1	
cer_edema	enter present as 1 absent as 2	1	2	2	2	1	2	1	1	1	1	1	1	2	1	1	2	1	2	2	2	1	2	1	1	1	
TC	low as 1 normal as 2 high as 3	3	3	2	2	2	2	3	2	2	2	3	2	2	2	1	2	3	3	2	2	2	3	2	3	3	
DC	normal as 1 abnormal as 2	2	2	1	1	2	1	1	2	1	1	2	1	1	1	1	2	2	2	1	1	1	2	1	2	2	
Platlet	low as 1 normal as 2 high as 3	2	2	2	2	1	2	2	2	2	2	2	1	1	2	1	2	2	2	1	2	1	2	2	1	2	
per_smear	normal as 1 abnormal as 2	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1	
sug	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	2	1	1	1	2	
elect	normal as 1 abnormal as 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	2	1	2	2	1	2	1	
Na	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	
K	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	1	1	2	1	3	1	1	2	1	
HCO3	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	3	1	3	1	1	3	1	
urea	normal as 1, high as 1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	2	1	1	1	2	1	2	1	1	2	1	
creat	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	1	
cal	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	3	1	
cs_NEC	growth as 1 no growth as 2	2	2	2	2	2	2	1	2	2	2	2	1	2	2	1	2	2	2	2	2	2	2	2	1	2	
LFT	normal as 1 elavated as 2	1	1	1	1	2	1	1	2	2	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	1	
PT	enter normal as 1 high as 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	
aPTT	enter normal as 1 high as 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	
Lactate	enter normal as 1 high as 2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	1	

Pyruvat	enter normal as 1 high as 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Ammonia	enter normal as 1 high as 2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1
Viral_stu	enter negative as 1 positive as 2 as JE as 3 Coxsckie as 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
PCR	enter negative as 1 positive as 2 as JE as 3 Coxsckie as 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mx	poasitive as 1 negative as 2	2	2	2	2	2	2	2	1	2	2	2	2	2	1	2	2	2	2	2	2	2	1	2	2	2	
ur_alb	enter absent as1 present as 2	2	1	2	1	1	2	1	1	1	1	2	1	1	1	2	1	2	1	2	1	2	2	1	1	2	
ur_sug	enter absent as1 present as 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	
ur_ket	enter absent as1 present as 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	
cs	growth as 1 no growth as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	
CSF_cells	enter present as 1 absent as 2	2	2	1	2	1	1	2	1	1	1	2	2	2	1	1	1	2	2	1	2	1	2	1	2	1	
CSF_sug	normal as 1 high as 2 low as 3	3	1	1	1	1	1	3	1	1	1	3	3	3	1	1	1	3	1	1	1	1	3	1	3	1	
CSF_pro	normal as 1 high as 2 low as 3	2	1	1	1	1	1	2	1	1	1	2	1	1	1	1	1	2	1	1	1	1	2	1	2	1	
CSF_cs	growth as 1 no growth as 2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	
CSF_Gr_st	poasitive as 1 negative as 2	2	2	2	2	2	2	2	2	2	2	1	2	1	1	2	2	2	2	2	2	2	1	2	2	2	
CSF_AFB	poasitive as 1 negative as 2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	
CSF_Vir_st	enter negative as 1 positive as 2 as JE as 3 Coxsckie as 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CSF_PCR	enter negative as 1 positive as 2 as JE as 3 Coxsckie as 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ABG_ph	normal as 1 acidosis as 2 alkalosis as 3	1	1	1	1	2	1	1	1	1	1	2	2	1	1	2	3	1	1	1	1	2	1	1	2	2	
ABG_po2	normal as 1 high as 2 low as 3	1	1	1	1	3	1	1	1	1	1	3	3	1	1	2	3	1	1	1	1	3	1	1	3	3	
ABG_pco2	normal as 1 high as 2 low as 3	1	1	1	1	3	1	1	1	1	1	3	3	1	1	3	3	1	1	1	1	3	1	1	3	1	
Xray_che	normal as 1 abnormal as 2	1	2	2	1	2	1	1	2	1	1	1	2	1	2	2	1	1	2	2	1	1	2	1	1	1	
Xray_skull	fracture as 1 no fracture as 2																										
EEG	seizures as 1 no seizures as 2		1																								
USG cranium	normal as 1 , abnormal as 2	2		2		2						2	1	2			1	2		2					2		
CT_scan	normal as 1 abnormal as 2	2	2					2	2					1	2			2	1				2		2		
MRI	normal as 1 abnormal as 2																										
Others	normal as 1 abnormal as 2																										
Fin_diag	infection as 1 metabolic as 2 epilepsy/sd as 3 vas/hemat as 4 tox/poi as 5 strutural as 6 others as 7	1	3	5	3	1	1	1	1	3	3	1	1	1	1	1	5	1	3	5	3	2	1	3	1	2	
outcome	recovered without disability as 1 recovered with disability as 2 expired as 3	1	3	3	1	1	1	2	1	2	1	2	3	1	2	3	1	2	3	3	1	1	2	1	3	1	

Parameters	Data Variables	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
age_m_d	enter actual days or months of baby as number	4	18	84	6	30	72	18	60	7	6	108	4	8	60	24	6	7	24	96	42	30	36	8	60	54
sex	enter male as 1 female as 2	1	1	2	1	2	1	2	2	2	1	2	1	2	2	2	1	1	2	1	2	1	1	2	1	1
dur_ps	enter actual duration of hours if hrs only															8										
dur_ps1	enter actual duration of day if day	10	10	5	4	4	15	16	3	14	6	10	16	20	2		2	6	7	6	8	10	10	2	6	4
ho_Trama	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
ho_Tra_dur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d																									
ho_Fever	enter present as 1 absent as 2	1	1	2	1	2	2	1	2	1	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1	2
ho_Fev_dur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d	4d	20d		2d			20d		7d	7d		3d	1d		3d	1d	2d	10d	7	5d	18d	7d	3d	30d	
ho_ALOC	enter present as 1 absent as 2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ho_AL_dur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d	1d	1d	12h	1d	2h	8h		6h	3h	1d	1d	6h	2h	2h	4h	2h	2h	1d	1h	1d	2d	1d	2d	1d	6h
ho_sei	enter present as 1 absent as 2	1	1	2	2	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ho_sei_dur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d	10h	1d			2h		3h	1h	3h	18h		2h	2h	2h	4h	2h	1h	6h	1h	3h	1d	6h	6h	1d	2h
ho_hdache	enter present as 1 absent as 2	2	2	1	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2
ho_hddur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d			6h								10d													1d	
ho_vomit	enter present as 1 absent as 2	2	1	1	2	2	2	2	1	2	2	1	2	2	2	1	2	2	1	2	2	2	1	2	1	2
ho_vo_dur	enter actual number with h as hour and d as d For ex 5 hours as 5 h, 3 day as 3d		2h	4h					2h			8d				1d			1d				1d		1d	
ho_skleison	enter present as 1 absent as 2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
ho_skldur	enter actual number with h as hour and day as d For ex 5 hours as 5 h, 3 day as 3d			6h																						
ho_TB	enter present as 1 absent as 2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2
ho_poiexp	enter present as 1 absent as 2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2
ho_sei_dis	enter present as 1 absent as 2	2	2	2	2	1	2	2	2	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	1
ho_ch_drug	enter present as 1 absent as 2	2	2	2	2	1	2	2	2	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	1
ho_devel_delay	enter present as 1 absent as 2	2	2	2	2	1	2	2	2	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	1
ho_anti_con	enter present as 1 absent as 2	2	2	2	2	1	2	2	2	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	1
temp	enter normal as 1 hyper as 2 hypothermia as 3	3	1	1	2	1	1	2	1	1	3	1	2	1	1	1	3	2	2	2	2	1	2	1	1	1
pulse	enter normal as 1 tachy as 2 bradycardia as 3	2	1	3	1	1	3	1	1	2	2	1	2	1	2	2	2	2	1	2	2	1	2	2	2	2
resp	enter normal as 1 tachy as 2 brady as 3 apnea as 4	2	1	2	1	1	4	1	4	4	4	1	2	1	2	2	4	4	1	2	2	2	2	2	2	2
Bp	enter normal as 1 hyper as 2 hypo as 3 unrecordable as 4	3	1	3	1	1	4	1	1	3	3	2	1	1	1	3	4	3	1	1	1	1	1	3	3	1
oth_sign	presence of anemia as 1 cyanosis as 2 clubbing as 3 jaundice as 4 edema as 5 eschar as 6 lmph. as 7	1	1	5	1						1	1		1	1	1	1		1		1	1	1	1	1	1

neu_mark	enter present as 1 absent as 2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
sk_jt_bld	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
head_inj	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
AF	enter open as 1 closed as 2	1	1	2	1	2	2	2	2	1	1	2	1	1	2	2	1	1	2	2	2	2	2	1	2	2	2
AF_yes	enter flat as 1 tense as 2 bulging as 3	3	2		2					2	2		2	2			3	1							3		
anthro_wt	enter normal as 1 low as 2 high as 3	1	1	1	2	2	1	1	1	1	1	1	1	1	2	1	1	1	2	2	1	2	1	1	2	2	
HC	enter normal as 1 micro as 2 macrocephaly as 3	1	1	1	1	2	1	1	1	1	1	1	1	1	2	1	1	2	1	2	1	1	1	1	1	2	
GCS_scr	enter actual score	5	7	5	7	6	4	6	6	7	5	7	6	7	6	4	5	6	7	6	6	6	6	4	5	7	
FE_pap	enter present as 1 absent as 2	1	1	2	2	2	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1	1	2	
FE_evi_bld	enter present as 1 absent as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Sign_men_irr	enter present as 1 absent as 2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2	
men_irr_site	enter neck regidity as 1 kernig as 2 brudzinsky as 3	1	1																			1			1		
pupils	reactive as 1 non reactive as 2, sluggishly reacting as 3	1	1	1	2	1	3	1	2	3	2	1	1	1	1	2	2	1	1	1	2	2	2	2	2	1	
dem	enter present as 1 absent as 2 defective as 3	2	2	1	2	2	3	1	2	2	3	1	1	1	2	2	2	1	1	2	2	2	2	3	3	2	
tone	enter normal as 1 hyper as 2 hypo tonia as 3	3	3	3	3	2	3	1	3	3	3	1	3	3	1	3	3	3	3	3	3	1	3	3	3	3	
reflex	enter normal as 1 hyper as 2 hyper reflexia as 3	3	2	3	3	2	3	3	1	3	3	1	3	3	1	3	3	3	1	3	1	1	3	3	3	1	
cer_edema	enter present as 1 absent as 2	1	1	2	2	1	2	2	2	1	1	2	1	1	2	1	1	2	2	2	1	1	1	1	1	2	
TC	low as 1 normal as 2 high as 3	3	2	2	3	2	2	2	2	3	2	2	3	2	2	3	2	3	2	2	2	3	3	3	3	2	
DC	normal as 1 abnormal as 2	2	1	1	2	1	1	1	1	1	1	1	2	1	1	2	1	1	1	1	2	2	2	2	2	1	
Platlet	low as 1 normal as 2 high as 3	2	2	2	1	2	2	2	2	2	1	2	1	2	2	1	2	1	2	2	2	1	1	2	2	2	
per_smear	normal as 1 abnormal as 2	1	1	1	2	1	1	1	1	1	2	1	2	2	1	2	1	1	2	1	1	1	2	1	1	1	
sug	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	
elect	normal as 1 abnormal as 2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1	1	
Na	normal as 1 high as 2 low as 3	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	
K	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	2	1	1	
HCO3	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	3	1	1	
urea	normal as 1, high as 1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	2	2	1	
creat	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	
cal	normal as 1 high as 2 low as 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	
cs_NEC	growth as 1 no growth as 2	1	2	2	1	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	
LFT	normal as 1 elavated as 2	2	2	2	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	2	2	1	2	1	2	1	
PT	enter normal as 1 high as 2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	
aPTT	enter normal as 1 high as 2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	
Lactate	enter normal as 1 high as 2	1	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	2	1	1	1	
Pyruvat	enter normal as 1 high as 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Ammonia	enter normal as 1 high as 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Viral_stu	enter negative as 1 positive as 2 as JE as 3 Coxsckie as 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
PCR	enter negative as 1 positive as 2 as JE as 3 Coxsckie as 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Mx	poasitive as 1 negative as 2	2	1	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2	
ur_alb	enter absent as1 present as 2	2	2	1	2	1	1	2	1	1	2	2	1	1	1	1	1	2	1	1	2	2	2	2	2	1	

ur_sug	enter absent as1 present as 2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ur_ket	enter absent as1 present as 2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
cs	growth as 1 no growth as 2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2
CSF_cells	enter present as 1 absent as 2	2	1	1	1	1	1	1	1	2	2	1	2	1	1	2	1	1	1	1	1	1	1	2	1	2	1
CSF_sug	normal as 1 high as 2 low as 3	3	3	1	1	1	1	1	1	1	3	1	3	1	1	1	1	1	1	1	1	3	3	3	3	1
CSF_pro	normal as 1 high as 2 low as 3	2	2	1	1	1	1	1	1	1	1	1	2	1	1	2	1	1	1	1	1	2	2	2	2	1
CSF_cs	growth as 1 no growth as 2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2
CSF_Gr_st	poasitive as 1 negative as 2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	1	1	1	2
CSF_AFB	poasitive as 1 negative as 2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2
CSF_Vir_st	enter negative as 1 positive as 2 as JE as 3 Coxsckie as 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CSF_PCR	enter negative as 1 positive as 2 as JE as 3 Coxsckie as 4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ABG_ph	normal as 1 acidosis as 2 alkalosis as 3	2	1	1	2	1	2	2	3	2	2	1	1	1	1	2	2	2	1	1	2	1	2	2	2	1
ABG_po2	normal as 1 high as 2 low as 3	3	1	1	3	1	3	3	3	1	3	1	1	1	1	3	3	3	1	1	3	1	3	3	3	1
ABG_pco2	normal as 1 high as 2 low as 3	3	1	1	2	1	3	1	3	3	3	1	1	1	1	3	3	3	1	1	3	1	1	3	3	1
Xray_che	normal as 1 abnormal as 2	1	2	1	2	1	1	1	1	1	2	1	2	2	1	1	1	2	1	1	1	2	1	1	2	1
Xray_skull	fracture as 1 no fracture as 2																									
EEG	seizures as 1 no seizures as 2				2																					
USG cranium	normal as 1 , abnormal as 2	2	2		2								2	2			2							2		
CT_scan	normal as 1 abnormal as 2	2	2	1		1	2	2	1	1	2	2		2	1		2	2			2	2	2	2	2	1
MRI	normal as 1 abnormal as 2			1						1	2				1						2			2	1	
Others	normal as 1 abnormal as 2																									
Fin_diag	infection as 1 metabolic as 2 epilepsy/sd as 3 vas/hemat as 4 tox/poi as 5 strutural as 6 others as 7	1	1	5	1	3	2	5	4	1	1	4	1	1	3	1	5	1	1	3	1	1	1	1	1	3
outcome	recovered without disability as 1 recovered with disability as 2 expired as 3	3	1	3	3	1	3	1	1	1	3	1	1	2	1	3	3	3	1	1	1	2	2	3	3	1